

Old Amherst Landfill Old Belchertown Road Amherst, Massachusetts

Final Comprehensive Site Assessment (FCSA) Report Volume 2 of 2

Prepared For:

Department of Public Works Amherst, Massachusetts

January 2009

HEALTH & SAFETY PLAN

Old Amherst Landfill Route 9 (South Side) Amherst, Massachusetts

Prepared for: Town of Amherst Department of Public Works Amherst, Massachusetts

August 2005



HEALTH AND SAFETY PLAN FOR ROUTINE SITE ACTIVITIES

- 1.0 Purpose The purpose of this health and safety plan (HSP) is to provide standards for worker safety and protection during field activities conducted on a frequent or routine basis. The plan outlines standards and mandatory procedures relative to physical and chemical hazards encountered at sites, communication, training, worker health monitoring, decontamination procedures and levels of personnel protection. Any questions concerning this information should be directed to Tighe & Bond Certified Industrial Hygienist, Mr. Michael J. Matilainen at 413-562-1600.
- <u>2.0 Applicability</u> This plan is applicable to all personnel working at sites where mandatory worker health and safety training is required by State or Federal agencies. It is intended for use at sites where information regarding potential site hazards is available in the form of background research, personal communication with past or present property owners or workers, previous sampling results, etc.

Available information should be provided to site workers as outlined in Section 5. This plan is applicable only when provided in conjunction with a site specific hazard evaluation summary including information outlined in that Section.

Activities to which this plan is applicable may include sampling of groundwater, wastewater and ambient air; inspection of drilling, excavation or construction activities; and other routine field activities. Activities involving contact with unknown substances and activities on sites where little background information is available will require more extensive and specific HSP development.

This plan does not cover procedures for entry into trenches, excavations or confined spaces. Project-specific attachments should be prepared and appended to the site hazard evaluation summary if those activities are planned. Work of this nature shall be performed in accordance with 29 CFR 1926.250 subpart P "Excavation, Trenching and Shoring", 29 CFR 1910.146 "Permit Required Confined Space Entry" and the Tighe &Bond "Employee Confined Space Entry Program".

3.0 Site Control - Work Zones - It is not anticipated that conditions on sites where this plan is applicable will require special measures to achieve site security or restriction of normal site activities and access. If special site control measures are necessary at individual sites, those measures must be outlined in the site specific hazard summary to be prepared for each site. Whenever possible, efforts should be made to minimize potential exposures at the sites. These can include but are not limited to remote sampling/materials handling, positioning workers upwind of work activities and rotation of employees.

4.0 Personnel Protection - Personnel protective equipment and safety requirements must be appropriate to protect against the known or worst potential hazards on the site. Protective equipment should be selected based on the concentrations and possible routes of exposure to known or potential worst case substances. The levels of personnel protective equipment are described in Section 8. All Tighe & Bond engineering or assessment personnel engaged in work on-site will be participants in the Tighe & Bond medical monitoring program described in Section 9, or a similar program.

It is anticipated that Level D or C protection and basic site safety measures will be sufficient at most sites. Any conditions warranting upgrading the required level of protection to Level B or A will be cause for all personnel to immediately leave the work site. The site will be re-evaluated and a new site health and safety plan will be prepared which incorporates the additional site information.

Whenever Level C is in use, the breathing zone of the workers will also be monitored constantly utilizing a photo-ionization detector (PID). If the total volatile organic concentration (as indicated by the PID) in the breathing zone of the workers approaches 50 ppm, work shall cease and the crew will exit the work area and evaluate the need to upgrade to Level B.

The specific respiratory protective device selected for Level C protection shall be the device identified on each individual's respirator fit test, as described in Section 5.3. In general, respirators will be supplied with combination cartridges for organic vapors, dusts, mists, and acid gasses and shall be approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health. In the event that a site hazard evaluation summary identifies the potential for exposure to other chemical substances (i.e. formaldehyde, Ammonia) additional cartridges will be supplied as necessary to be made available at the site.

- <u>5.0 Communications and Training</u> Workers at State and Federally listed or recognized sites must be provided with adequate information and training to recognize and evaluate potential hazards. Training shall comply with applicable regulations including 29 CFR 1910.1200 "Hazard Communication Standard"
 - 5.1 Communication The Project Manager shall supply all on-site personnel with a site-specific hazard evaluation summary to be used in conjunction with this plan. The summary shall cover, at a minimum, the following topics:
 - a. A brief description of the history of the location with regards to health and environmental hazards.
 - b. A description of the activities to which the hazard evaluation summary is applicable to.

- c. A description of any hazards which may be encountered, including:
 - 1. Physical Hazards terrain, traffic, equipment, severe weather (heat stress and frostbite), electrical hazards, noise.
 - 2. Chemical Hazards materials used and stored at the site, materials released at the site.
 - 3. Biological Hazards insects, plants, animals, pathogens, infectious materials.
- d. A description of the levels of protection selected for the operation.
- e. Equipment decontamination procedure if different from those specified herein.
- f. Summary of emergency contacts for use in the event of fire, explosion, medical emergency or other emergency, including the location of the nearest telephone and an address and phone number to provide to emergency personnel.
- g. A map showing the route to the nearest hospital.
- h. A summary of available recent monitoring data and relevant chemical information.
- 5.2 Health and Safety Training All personnel will be provided with approved health and safety training as outlined in 29 CFR 1910.120(e). Copies of current training documentation for all site workers will be available at the site. Documentation for Tighe & Bond employees should also be maintained at a central location at the Tighe & Bond office.
- 5.3 Respirator Usage Training and Fit Testing Prior to assignment to a site where respirator use may be required, employees will be provided with respirator training as outlined in 29 CFR 1910.134(e)(5). Respirator fit tests are to be conducted at 6 to 10 month intervals, or at any time when a condition that may change the fit of a respirator has occurred, such as change in weight, change in facial structure, extensive dental work, etc. All use of respirators shall comply with Tighe & Bond's written respiratory program.

6.0 Decontamination Procedures

6.1 Personnel Decontamination - If Level D protection is used, any disposable inner gloves or protective clothing should be sealed in a plastic bag and properly disposed of. Moisture resistant outer gloves and outer boots should be rinsed to remove gross contaminants, and then sealed in a plastic bag. Any further decontamination required should be performed at the laboratory. Disposable equipment should be used whenever possible.

If Level C or greater protection is used, personnel are required to follow the decontamination procedures listed below, as they apply to the gear being worn:

- a) Wash boots thoroughly with clean water or an appropriate cleaning solution to remove gross contaminants.
- b) Scrub down outer boots in decontamination solution and rinse with water.
- c) Remove boots.
- d) If wearing reusable raingear, it should be cleaned in a similar manner as the boots.
- e) Disposable Tyveks should be removed and placed in trash receptacle.
- f) Spent cartridges can also be discarded in the trash receptacle.
- g) Remove outer gloves and wash in same manner as boots while wearing disposable inner gloves.
- h) Use a new set of disposable gloves to clean additional equipment including hard hat, safety glasses, etc.
- Decontamination wash and rinse water will be allowed to percolate into the ground or as specified.
- 6.2 Equipment Decontamination Proper decontamination of all equipment is necessary to avoid transferring contaminants from the site, thereby increasing potential for exposure of on-site and off-site personnel. The measures described below should be followed prior to leaving all sites, as applicable to the equipment being used. Any variations from the procedures described below for reasons of worker health or safety must be described by the Project Manager in the site specific hazard summary.

These measures are separate from, and may not be substituted for, other decontamination procedures associated with proper sampling protocol

- a) Sampling equipment such as measuring tapes and bailer cords may be decontaminated at the sampling area. The equipment may be thoroughly rinsed with clean water or an appropriate cleaning solution and wiped dry with paper towels before leaving the work site. Alternatively, they may be wrapped in absorbent material and/or stored in plastic bags sealed to prevent contact with workers, vehicles, etc.
- b) The rinse water from this operation will be allowed to percolate into the ground or as specified.
- c) Decontamination of drilling equipment including drill rigs, backhoes, drill rods, augers, etc. will take place at the site of each boring/monitoring well or test pit prior to moving to subsequent locations. Decontamination of such equipment will entail a thorough steam cleaning, or washing and rinsing of the equipment with high pressure water followed by air drying. In addition, the tires and undercarriages of vehicles exiting areas identified as having surficial hazardous materials will be sprayed with high pressure water and allowed to dry before leaving the contaminated area.
- d) Contaminated soil brought to the surface during any well installation or soil excavation activities with a total organic vapor concentration (TOV) greater than 10 ppm as registered by the field PID will be segregated into an area lined with 6 mil (minimum) polyethylene. The piles will be surrounded by an earth berm, and will be covered with 6 mil (minimum) polyethylene pending proper disposal or reuse.

7.0 Emergency Procedures

7.1 Inhalation

- a) If warning signals such as: dizziness, nausea, headache, shortness of breath, burning sensation in mouth, throat or lung or symptoms specific to hazard found at the site are apparent, the victim should leave the contaminated air space immediately. Have someone contact emergency services and obtain health and safety information about potential contaminants.
- b) If unconscious, the victim should be pulled out of the contaminated area immediately if they do not have any injuries, which would prohibit moving them (i.e. spiral injury). The rescuers should make sure that the area is safe to enter. If the area cannot be safely entered, attempt to ventilate this

- area. Do not attempt a rescue. Rescuers should make sure they are properly trained in First Aid and rescue and that they are wearing proper respiratory and protective equipment before attempting the rescue.
- c) If the victim is no longer breathing, mouth-to-mouth resuscitation or some other form of artificial respiration should administered by a person who is properly trained and certified in a location away from the contaminated area.

Medical attention should be obtained as soon as possible.

7.2 Skin Exposure - The skin should be washed with copious amounts of soap and water. If clothing is contaminated, it should be removed immediately and the skin washed thoroughly with running water. If a shower is available, it should be used immediately and clothes should be removed while showering. This procedure may be life-saving as certain highly toxic chemicals are rapidly absorbed through the skin.

All contaminated parts of the body, including the hair, should be thoroughly decontaminated. It may be necessary to wash repeatedly.

<u>7.3 Ingestion</u> - A poison control center or emergency service should be contacted immediately to determine an appropriate course of action. If possible, have health and safety information on the poison available when you call for help. Vomiting should be induced except when the substance presents an aspiration hazard, such as from a petroleum product; or when the substance is strong acid or alkali. To induce vomiting, a tablespoon of salt or powdered mustard in a glass of warm water or syrup of ipecac from the First Aid Kit can be taken as an emetic.

Drinking plenty of water and placing a finger down the throat may also be effective in inducing vomiting. The treatment should be repeated until vomit is clear.

Medical attention should be obtained immediately.

<u>7.4 Eyes</u> - It a toxicant should get in the eyes, they should be washed with plenty of water. The eye itself should be held open, rotated, and flooded with water so that all surfaces are washed thoroughly. Washing should be continued for at least 15 minutes.

Medical attention should be obtained immediately.

- <u>7.5 Exposure to Heat or Cold</u> When working under severe weather conditions, personnel should be aware of the signs of heat stress, hypothermia and frostbite as well as the appropriate response actions.
- a) Heat Stress If a worker shows signs of heat stroke (dry, hot, red skin, high body temperature) or heat exhaustion (cool, moist, pale or red skin, dilated pupils, nausea, dizziness), the worker must be removed from the work area and cooled. Loosen clothing, elevate feet, and provide cool liquids. Heat stroke can be life threatening and requires rapid action.
- b) Hypothermia If a worker shows signs of hypothermia (shivering, impaired judgement, drowsiness, clumsiness) the worker must be removed from the work area and warmed gradually.
- c) Frostbite If a worker shows signs of frostbite (skin color changes to white or grayish-yellow then grayish-blue), the worker must be moved to a warm place. The affected area should be placed in warm (100-105°F) water. Do not rub or massage.
- <u>7.6 Stings and Bites</u> If still present, remove stinger with fingernail. Work the site with soap and water. Cover with bandage and apply ice. If severe allergic reactions appear (hives, itching, rash, nausea, vomiting, dizziness, swelling) seek medical attention immediately.
- 8.0 Levels of Protection While this plan is not intended for use at sites where levels of protection above Level C are required, all four Levels (A through D) are described below. Workers should leave the site pending further evaluation if conditions requiring Level A or Level B protection are observed or detected.
 - 8.1 Level A protection should be worn when the highest available level of respiratory, skin, and eye contact protection is needed. While Level A provides the maximum available protection, it does not protect against all possible airborne or splash hazards. For example, suit material may be rapidly permeable to certain chemicals in high air concentrations or heavy splashes.

A. Personnel Protection Equipment

- Positive pressure self-contained breathing apparatus (SCBA), OSHA\NIOSH approved, operated in the positive pressure mode.
- Totally encapsulated suit (boots and gloves attached).
- Gloves inner (tight-fitting and chemical-resistant).

- Boots chemical-protective, steel toe and shank. Depending on suit boot construction, worn over suit boot.
- Gloves outer, chemical-resistant. Depending on suit construction, worn over suit gloves. May be replaced with tight-fitting, chemical-resistant gloves worn inside suit gloves.
- Underwear cotton, "long-john" type (optional).
- Hard hat (under suit).
- Disposable protective suit, gloves and boots. Worn under or over encapsulating suit.
- Coveralls (under suit).
- 2-way radio communications.

Use Level A:

- 1. When the type(s) and concentrations(s) of toxic substances are known to require the highest level of combined protection to the respiratory tract, skin, and eyes. These conditions would be:
 - a) Atmospheres which are "immediately dangerous for life and health" (IDLH). IDLH's are detailed in the NIOSH/OSHA's "Pocket Guide to Chemical Hazards" and/or other references.
 - b) Known atmosphere or potential situations that would affect the skin or eyes, or could be absorbed into the body through these surfaces in toxic quantities.
 - Potential situations are those where vapors may be generated or splashing may occur through site activities.
 - Standard reference books should be consulted to obtain concentrations hazards to skin, eyes, or mucous membranes.

- Oxygen deficient atmospheres with above conditions.
- 2. At sites where the type(s) and/or potential concentration(s) of toxic substances are unknown.
 - a) Unless there is information available to strongly indicate otherwise, the site should be presumed to present hazards to the respiratory system, skin, and eyes. Level A protection would provide the highest level of protection for the initial entry team.
 - b) Enclosed areas such as building, railroad cars, ship holds, etc.
- 3. When total vapor readings of 500 ppm to 1,000 ppm are obtained on instruments such as a photo-ionization detector (PID) or organic vapor analyzer (OVA) in the breathing zone.

It is not anticipated that work will be done under conditions requiring Level A protection. If such conditions are encountered, operations will cease immediately and all personnel will immediately leave the area. Workers shall not re-enter the area until a more comprehensive HSP specifically appropriate for such conditions has been prepared, or until there is clear evidence that the conditions requiring Level A protection have abated.

<u>8.2 Level B</u> - Level B protection should be selected when the highest level of respiratory protection is needed, but exposure to the small unprotected areas of the body (i.e. neck and back of head) is unlikely, or where concentrations are known to be within acceptable exposure standards.

A. Personnel Protective Equipment

- Positive pressure SCBA, OSHA/NIOSH approved, operated in the positive pressure mode.
- Hooded, two-piece chemical-resistant suit.
- Gloves outer, chemical-protective.
- Boots outer (chemical-protective, steel toe and shank).
- 2-way radio communications.

- Hard hat.
- Face shield (optional).

Use Level B

- 1. When the type(s) and concentration(s) of hazardous substances are known to require the highest degree of respiratory protection; but a lower level of skin protection, i.e. in
 - a) Atmospheres which are "immediately dangerous for life and health" (IDLH). Type(s) and concentration(s) of vapors in air do not present a hazard to the small, unprotected areas of the body.
 - b) Atmospheres with concentrations of known substances greater than protection factors associated with full-face, "air purifying" respirators with appropriate cartridges.
 - c) Atmospheres with less than 19.5 percent oxygen.
- 2. When a determination is made that potential exposure to the body parts not protected by a fully encapsulated suit (primarily neck, ears, etc.) is highly unlikely.
- 3. Total vapor levels range from 50 ppm-500 ppm on instruments such as a photo-ionization detector or organic vapor analyzer and the atmosphere does not contain suspected high levels of toxic substances affecting skin or eyes.
- 4. Normal drilling and sampling operations will cease if conditions are such that Level B protection would be required.
- <u>8.3 Level C</u> Level C protection should be selected when the types and concentrations of respirable materials are known, have adequate warning properties, or are reasonably assumed to be not greater than the protection factors associated with air-purifying respirators; and exposure to the few unprotected areas of the body (i.e., neck and back of head) is unlikely to cause harm. Continuous monitoring of site and/or individuals should be established.
- A. Personnel Protective Equipment

- Half-face, or full-face, air-purifying respirator (OSHA/NIOSH approved).
- Chemical-resistant outer clothing.
- Gloves inner (tight-fitting, chemical-resistant type or woven liners).
- Gloves -outer (chemical resistant).
- Hard hat (face shield optional).
- Boots outer (chemical-protective).
- Safety glasses.

- Site known to contain potentially hazardous materials resulting in air concentrations requiring a protection factor afforded by a fullface or half-face, air-purifying respirator (OSHA/NIOSH approved).
- 2. Well-documented, reliable history of site and patterns of prior entry.
- 3. No evidence to suspect acute or chronic toxicity to exposed skin.
- 4. Total vapor reading between 0 ppm and 50 ppm on instruments such as the photo-ionization detector or organic vapor analyzer.

Continuous air or personnel monitoring should occur while wearing Level C protection.

<u>8.4 Level D</u> - Level D is the basic work uniform and should be worn for all site operations. Level D should be selected when performing environmental sampling involving dilute concentrations of contaminants on sites that have been characterized by previous analyses or research.

A. Personnel Protective Equipment

Standard work clothing.

- Optional disposable chemical-resistant clothing appropriate for known or expected levels of contamination.
- Boots/Shoes safety or chemical-resistant boots.
- Safety glasses or safety goggles available.
- Gloves disposable latex or cotton.
- Optional moisture resistant outer gloves.
- Hard hat available for drilling operations.

- 1. No indication of airborne health hazards present.
- 2. No gross indication above background on the photo-ionization detector and/or organic vapor analyzer.
- 9.0 Medical Monitoring All engineering and assessment personnel engaged in on-site activities shall be participants in a medical monitoring program similar to the following. As participants in this program, these individuals will have had recent physical examinations.

The primary goal of this medical monitoring program is to provide evaluation and ongoing surveillance of the health status of employees potentially exposed to toxic substances as a result of their work-related activities. An active health monitoring program for those employees potentially at risk is an important tool in evaluating the effects of chronic low-level exposures or acute exposures related to operations at hazardous waste sites. The effects of low-level exposures may not become apparent until years after the initial exposure.

This medical monitoring program includes laboratory testing, personnel medical history evaluation, physical examination, and specific systematic testing.

Each participant in this medical monitoring program undergoes a complete occupational history evaluation, and baseline physical examination including the following parameters:

- Pulmonary Function Studies
- Complete Blood Count
- Chemical Blood Profile

- Urinalysis
- Chest X-Ray
- Electrocardiogram
- Specific parameters as necessary dependent upon exposure.

Following the establishment of each participant's baseline values for the above parameters, an annual re-evaluation is conducted to monitor potential changes due to work with hazardous materials.

In addition to this annual re-examination, provisions are made for specific post-exposure examinations in the event of a suspected exposure during a particular field event.

The program shall meet or exceed the minimum requirements established in OSHA standard 20 CFR 1910.120.

F./PROJECTS/G/G263/MCP/PHASE2-3-4/HASP/HSP-RSA DOC

SITE HAZARD EVALUATION SUMMARY { PRIVATE }

Brief Location History: Old Amherst Landfill -

The landfill consists of three waste disposal areas, a municipal solid waste disposal area, a concrete and masonry demolition disposal area and a wood a stump dump area. The waste disposal areas were closed and capped in 1986 using a variable depth clay soil barrier system.

Field activities to be conducted under this HASP include site walks, soil and sediment soil sample collection, boring and monitoring well installation, survey, and other activities associated with the new Massachusetts Department of Environmental Protection regulations associated with landfill closure.

Applicable Activities: This Site Hazard Evaluation Summary (SHES) is applicable to Tighe & Bond field personnel engaged in the excavation of soil, subsurface exploration activities and the collection of environmental samples. All other site personnel should follow their company specific Health & Safety Plan.

A. PHYSICAL HAZARDS

- 1. <u>Terrain</u> –The areas of the proposed work may be variable in elevation and terrain as associated with the current landfill cap. The area is covered with various media, including grass and vegetation, soils, clay, gravel, etc.
- 2. <u>Traffic</u> The site is gated from Route 9. The only vehicles present inside the fencing will be involved with landfill activities.
- 3. <u>Equipment</u> Exercise appropriate caution when working near excavation and/or drilling equipment and trucks. Avoid standing directly behind the machines and vehicles.
- 4. Other The subsurface may contains utility lines. Extreme caution should be utilized during excavation.

B. CHEMICAL HAZARDS

- 1. <u>Materials Used/Stored at Site</u> Materials buried on the site may contain various concentrations of hazardous materials.
- 2. <u>Materials Released at Site</u> Elevated levels of landfill gas, VOC's and metals have been identified in various media on site.
- C. BIOLOGICAL HAZARDS (insects, animals, poisonous plants, pathogens/infectious materials, etc. describe if anticipated) Insects and Poison Ivy may be present during the spring and summer months.

Level of Protection – Procedures for operating within the landfill are consistent with Level D, and may include hardhat, steel toed boots, eye wear, safety vests, or gloves.

Equipment Decontamination - Wash sampling equipment with a detergent soap in between sampling. All other applicable decontamination procedures as specified within the Contractor Health & Safety Plan should be followed.

SUMMARY OF EMERGENCY CONTACTS

Telephone Availability

X Available in employee vehicle

Nearest location to be determined upon arrival on site

Town of Amherst

Fire Department 911

(Call in the event of chemical release, fire or explosion)

Police Department
(Call in the event of explosion)

Ambulance 911

(Call in the event of physical injury, heat stress, frostbite, chemical exposure)

Attach map showing route to nearest hospital

Name: Cooley Dickenson Hospital 30 Locust Street (Route 9) Northampton, MA, 01061-5001

1-413-582-2108

Massachusetts Poison Control Center

(Call in the event of poisoning by ingestion, inhalation, etc.)

1-800-682-9211

911

Be prepared to provide emergency personnel with the following:

Phone number at site:

(Employee Cell Phone - to be determined upon

arrival on-site)

Address of site:

Route 9

- Nearest cross road:

South Side of Rte 9, near Harkness Road

Hazard exposed to:

- Any vital signs (pulse, breathing, etc.)

Other applicable emergency contacts:

1. Tighe & Bond:

Jeffrey Thelan,

(413)-572-3260

2. Tighe & Bond:

Matt Abraham

(508) 471-9602

3. DEP:

Wstern Regional Office

(413) 784-1100

DOCUMENTATION{PRIVATE }

INSTRUCTIONS: Field personnel are required to receive a copy of the health and safety plan (HSP), and to read, understand, and agree to the provisions of the plan. The Project Manager (PM) is responsible for distributing the HSP to personnel as they are assigned to the project. Personnel are required to sign this form indicating receipt of the HSP. The original of this form is maintained by the PM, and becomes part of the permanent project files. Copies of this form are to be sent to Michael J. Matalainen, CIH.

SITE NAME: Massachusetts Electric Company - Groton Street Substation

LOCATION: Groton Street, Pepperell, Massachusetts

I have received a copy, read, understood, and agree to comply with the provisions of the above referenced HSP for work activities on this project.

{PRIVATE }PRINTED NAME/COMPANY	SIGNATURE	DATE
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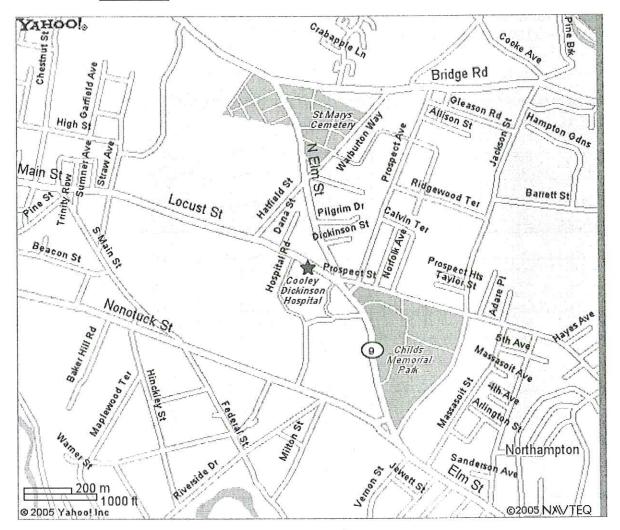
HOSPITAL DIRECTION SHEET

Cooley Dickenson Hospital

30 Locust Street (Route 9) Northampton, MA, 01061-5001 Emergency Room-Phone:

1-413-582-2108

Area Map



Directions-

Follow Route 9 from Amherst into North Hampton

Driving Directions

- 1. Take Route 113 east to Route 3
- Take Route 3 North (F.E. Everett Turnpike);
- 3. Take Exit 5E.
- 4. Go straight through the next two stop signs. At the first set of lights take a right into the St. Joseph Hospital parking lot.

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A-0308-7-01 February 28, 2008

Mr. Laurence Hanson MassDEP Division of Solid Waste 436 Dwight Street Springfield, MA 01103

Re: Updated Private Well Survey
Feb. 14, 2008 FCSA Extension
Old Amherst Landfill Site
MassDEP SLF# 08-008-001

Dear Mr. Hanson:

On behalf of the Amherst Department of Public Works (DPW), Tighe & Bond is submitting an updated private water well survey for the Old Amherst Landfill site as required by Massachusetts Department of Environmental Protection (MassDEP) correspondence dated October 23, 2007 Interim Comprehensive Site Assessment (CSA) Report Approval and MassDEP correspondence dated February 14, 2008 Final Comprehensive Site Assessment (FCSA) Deadline Extension. In summary, MassDEP has required that the Town update the existing private water well survey for the Old Amherst Landfill for a ½-mile radius from the landfill site including extending survey boundaries to the Fort River west and northwest of the site and to Hop Brook west and southwest of the site. The survey is to be completed by a comparison of Town Water Department records and Assessor records.

Tighe & Bond has completed the survey as required. Attached are tables listing identified private residential drinking water supply wells in the Towns of Amherst, Belchertown and Pelham where parcel boundaries fell within the required private well survey limits. No private residential drinking water supply wells were identified that are downgradient of the Old Amherst Landfill. All identified private wells are upgradient of the Old Amherst Landfill and are not likely to be impacted by the landfill site. A Private Well Survey Map is provided that identifies residential properties with private wells as listed in the attached tables.

Private Well Survey Method

The Town of Amherst provided Tighe & Bond with GIS mapping, Water Department records, Assessor records and the layout of the Towns public water supply system (water lines). Using this data, Tighe & Bond created a half mile survey limit around the property boundaries of the Old Amherst Landfill site and also extended the survey limit Hop Brook south and west of the site and to the Fort River to the west and northwest of the site. Based on the limits of the survey area, the total number of parcels included in the survey was 775 lots. The majority of



the parcels were located in the Town of Amherst with a few lots located in the Towns of Belchertown and Pelham.

Once the parcels were identified in the study area, Tighe & Bond used a process of elimination to reduce the number of parcels in the study area by matching Assessor records and Water Department records to eliminate 545 parcels as each of them had a Water Department account in the Town of Amherst. Of the remaining 230 lots Tighe & Bond was then able to eliminate 207 parcels based on the land use code of each in the Towns GIS database as follows:

- APR TOBACC (2 lots)
- CONDO MDL-05 (88 lots): All are part of Echo Hill Condo Complex, which includes Webster Court, Sutton Court, and Bedford Court
- FIELD CRPS (19 lots)
- MUNICPAL V (21 lots)
- NONPRWETLD (1 lot)
- PASTURE MDL-00 (2 lots)
- UNDEV LAND (1 lots)
- RES ACLNUV (37 lots): Vacant Land in a Residential Zone or Accessory to Residential Parcel – Developable Land
- RES ACLNUD (30 lots): Vacant Land in a Residential Zone or Accessory to Residential Parcel - Undevelopable Land
- AC LAND IMP (2 lots): Accessory Land with Improvements
- DEVEL LAND (2 lots): Vacant Land Developable
- PASTURE (3 lots)
- POT DEVEL (1 lot): Vacant Land Potentially Developable Land

Tighe & Bond subsequently eliminated an additional 8 lots based on their description as Open Space or ROW in the Assessor' database, which then left 15 lots with potential private wells. Also, Tighe & Bond was already aware of 3 lots within the study area that have a confirmed private well, which in turn eliminated those lots leaving 12 lots in Amherst to be field checked.

Parcels located in Belchertown and Pelham were similarly evaluated to determine if developed parcels were served by a private residential water supply well. Because Amherst Town water extends into Belchertown along Route 9 (Federal Street in Belchertown) and along Harkness Road, some of the developed parcels in Belchertown and Pelham are served by the Amherst Town water supply and do not use a private well for domestic supply.



Private Well Survey Results

A total of 24 private water supply wells were identified in the study area; all are located in the upgradient groundwater flow direction from the Old Amherst Landfill. None are likely to be impacted by groundwater quality at the landfill site. The 24 wells consist of 11 private wells in Amherst (10 wells along Harkness Road and one well on Old Belchertown Road), 11 private wells in Pelham along Harkness Road and 2 wells in Belchertown along Route 9 (Federal Street). Private well addresses and parcel identifications are listed on the attached summary table.

If you have any questions or comments on the information provided herein, please do not hesitate to contact me at (413) 572-3260.

Very truly yours,

TIGHE & BOND, INC.

Jeffery J. Thelen, P.G.

Senior Hydrogeologist

J:\A\A0308\Old LF CSA\2008 PW-Survey\0208 CSA Private Well Survey Ltr1.doc

Enclosures

Copy: Mr. Guilford Mooring, P.E., Superintendent, Amherst DPW (w/encl.)

Mr. Robert Pariseau, Director of Water Resources, Amherst DPW (w/encl.)

Map Parcel ID	Address / Location	Owner Name	Parcel Size (Acres)	LandUse
AMHERST				The state of the s
18D-39	166 HARKNESS RD	SMITH, FREDERICK A & DIANE J	0.88	SINGLE FAM MDL-01
18D-42	196 HARKNESS RD	LAMBERT, MEGAN D & MERGENDAHL, DANA S	1.64	SINGLE FAM MDL-01
18D-41	202 HARKNESS RD	KRIS, JEFFREY D	0.92	SINGLE FAM MDL-01
18D-40	218 HARKNESS RD	WIEMOKLY, GARY E	1.87	SINGLE FAM MDL-01
18D-32	236 HARKNESS RD	CROOKER, BENJAMIN C JR	1.00	SINGLE FAM MDL-01
18D-99	256 HARKNESS RD	PROTHERS, STEVEN R & LINDA L	0.96	SINGLE FAM MDL-01
18D-100	264 HARKNESS RD	SUNBOW 5 FOUNDATION/PLANETARY	1.54	PRI SCHL R MDL-01
18D-25	284 HARKNESS RD	MAGGS, ANN S	0.92	SINGLE FAM MDL-01
18B-308	318 HARKNESS RD	TOBEY, WILLIAM B	5.41	SINGLE FAM MDL-01
18D-44	300 HARKNESS RD	SKOLFIELD, KAREN D & GOECKEL, DENNIS L	1.70	SINGLE FAM MDL-01
21B-12	126 OLD BELCHERTOWN RD	HOBART, KENNETH E	1.75	SINGLE FAM MDL-01
21A-102	163 WILDFLOWER DR	DORFMAN, KATHERINE A (Geothermal Well)	0.74	SINGLE FAM MDL-01
BELCHERTOW	I N			
203-8	1310 FEDERAL ST			RESIDENCIAL
203-6	1311 FEDERAL ST	PELHAM AUTO SERVICE (SEE 203-7 for WELL)		COMMERCIAL
203-7	1321 FEDERAL ST	BACK in MOTION (CHIROPRACTIC OFFICE)		COMMERCIAL
		(Note: Parcels 203-6 and 203-7 share a well)		
PELHAM				
1-8	100 HARKNESS RD	CRAWFORD CAROLYN M		RESIDENCIAL
1-7	116 HARKNESS RD	SINGER, HOWARD & TERRY		RESIDENCIAL
1-6-1	130 HARKNESS RD	SEYMOUR HARRY & CHARLENA		RESIDENCIAL
1-6-2	132 HARKNESS RD	PRICE ROBERT & PIERRETTE		RESIDENCIAL
1-6-3	134 HARKNESS RD	OSTERWEIL, LEON & CLARKE, LORI A		RESIDENCIAL
1-6-4	136 HARKNESS RD	PALLEY GORDEN B & MIS-PALLEY CYNTHI		RESIDENCIAL
1-6-5	138 HARKNESS RD	ACKER, SARA ELINOFF & PETER P		RESIDENCIAL
1-3.D	140 HARKNESS RD	LUKAS TILMAN & LISA		RESIDENCIAL
1-3-2	144 HARKNESS RD	BURGOFF, JAMES & MATTHEWS, SARAH		RESIDENCIAL
1-2	146 HARKNESS RD	SCHMITTER MONIKA A	1	RESIDENCIAL
1-3.A	150 HARKNESS RD	SHUMWAY EARLE & JEANNE		RESIDENCIAL

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*******************************
           HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
                                                        **
            HELP MODEL VERSION 3.01 (14 OCTOBER 1994)
                                                        **
              DEVELOPED BY ENVIRONMENTAL LABORATORY
**
                USAE WATERWAYS EXPERIMENT STATION
                                                        * *
           FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
                                                        * *
******************************
PRECIPITATION DATA FILE:
                    j:\a\a0308\help3\precip1.D4
TEMPERATURE DATA FILE:
                    j:\a\a0308\help3\temp1.D7
SOLAR RADIATION DATA FILE:
                    j:\a\a0308\help3\solar1.D13
EVAPOTRANSPIRATION DATA:
                    j:\a\a0308\help3\evapo1.D11
SOIL AND DESIGN DATA FILE:
                    j:\a\a0308\help3\exist2.D10
OUTPUT DATA FILE:
                    j:\a\a0308\help3\exist2.OUT
TIME: 15:53
            DATE: 1/19/2009
TITLE: Old Amherst Landfill - Existing Conditions Soil Cover System
*******************************
   NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
          COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.
```

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER MATERIAL TEXTURE NUMBER 5

THE TENTE I	3111 0111	TOT IDDIC 5	
THICKNESS	=	12.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTEN	JT =	0.2468	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000009	5000E-02

NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 4.90
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 3 - BARRIER SOIL LINER MATERIAL TEXTURE NUMBER 10

THICKNESS	=	8.00 INCHES
POROSITY	=	0.3980 VOL/VOL
FIELD CAPACITY	=	0.2440 VOL/VOL
WILTING POINT	=	0.1360 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3980 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.119999997000E-03 CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER MATERIAL TEXTURE NUMBER 3

THICKNESS	=	.4.00 INCHES
POROSITY	=	0.4570 VOL/VOL
FIELD CAPACITY	=	0.0830 VOL/VOL
WILTING POINT	=	0.0330 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1321 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.310000009000E-02 CM/SEC

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER MATERIAL TEXTURE NUMBER 19

THICKNESS	=	420.00 INCHES
POROSITY	=	0.1680 VOL/VOL
FIELD CAPACITY	=	0.0730 VOL/VOL
WILTING POINT	=	0.0190 VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0713 VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02 CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 5 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 2.% AND A SLOPE LENGTH OF 500. FEET.

SCS RUNOFF CURVE NUMBER	=	53.30	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	33.640	ACRES
EVAPORATIVE ZONE DEPTH	=	12.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	2.962	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	5.484	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	0.696	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	36.615	INCHES
TOTAL INITIAL WATER	=	36.615	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR
EVAPOTRANSPIRATION AND	WEATH	ER DATA	

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM WORCHESTER MASSACHUSETTS

MAXIMUM LEAF AREA INDEX	=	4.00	
START OF GROWING SEASON (JULIAN DATE)	=	127	
END OF GROWING SEASON (JULIAN DATE)	=	281	
AVERAGE ANNUAL WIND SPEED	=	10.30 MPH	
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	65.00 %	
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	63.00 %	
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	72.00 %	
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	71.00 %	

NOTE: PRECIPITATION DATA FOR WORCESTER WAS ENTERED FROM THE DEFAULT DATA FILE.

MASSACHUSETTS

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR WORCHESTER

MASSACHUSETTS

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
23.30	24.80	33.10	45.00	55.70	64.60
69.90	68.00	60.30	50.30	39.50	27.40

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING COEFFICIENTS FOR WORCHESTER MASSACHUSETTS

STATION LATITUDE = 42.21 DEGREES

**************************** ANNUAL TOTALS FOR YEAR 1977

	INCHES	CU. FEET	PERCENT				
PRECIPITATION	48.90	5971334.000	100.00				
RUNOFF	7.019	857101.562	14.35				
EVAPOTRANSPIRATION	25.539	3118673.250	52.23				
PERC./LEAKAGE THROUGH LAYER 2	16.346552	1996129.750	33.43				
AVG. HEAD ON TOP OF LAYER 2	0.0165						
PERC./LEAKAGE THROUGH LAYER 4	16.346550	1996129.500	33.43				
CHANGE IN WATER STORAGE	-0.005	-569.238	-0.01				
SOIL WATER AT START OF YEAR	36.615	4471184.500					
SOIL WATER AT END OF YEAR	36.610	4470615.500					
SNOW WATER AT START OF YEAR	0.000	0.000	0.00				
SNOW WATER AT END OF YEAR	0.000	0.000	0.00				
ANNUAL WATER BUDGET BALANCE	0.0000	-0.699	0.00				

ANNUAL TOTALS FOR YEAR 1978

	INCHES	CU. FEET	PERCENT
PRECIPITATION	41.77	5100668.500	100.00
RUNOFF	11.355	1386587.000	27.18
EVAPOTRANSPIRATION	21.054	2571006.000.	50.41
PERC./LEAKAGE THROUGH LAYER 2	7.743556	945590.375	18.54

AVG. HEAD ON TOP OF LAYER 2	0.0079		
PERC./LEAKAGE THROUGH LAYER 4	12.357518	1509016.120	29.58
CHANGE IN WATER STORAGE	-2.997	-365941.500	-7.17
SOIL WATER AT START OF YEAR	36.610	4470615.500	
SOIL WATER AT END OF YEAR	31.196	3809389.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	2.418	295284.812	5.79
ANNUAL WATER BUDGET BALANCE	0.0000	0.582	0.00
**********	*****	*****	*****
********			*****
ANNUAL TOTALS	FOR YEAR 1979		
	INCHES	CU. FEET	PERCENT
PRECIPITATION		6556257.500	100.00
RUNOFF	16.706	2039986.250	31.12
EVAPOTRANSPIRATION	24.375	2976469.250	45.40
PERC./LEAKAGE THROUGH LAYER 2	14.258240	1741119.250	26.56
AVG. HEAD ON TOP OF LAYER 2	0.0190		
PERC./LEAKAGE THROUGH LAYER 4	12.333560	1506090.500	22.97
CHANGE IN WATER STORAGE	0.276	33711.922	0.51
SOIL WATER AT START OF YEAR	31.196	3809389.250	
SOIL WATER AT END OF YEAR	33.890	4138386.000	
SNOW WATER AT START OF YEAR	2.418	295284.812	4.50
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.349	0.00
***********	******	********	******
**********	*****	*****	*******
ANNUAL TOTAL	S FOR YEAR 1980) 	
	INCHES	CU. FEET	PERCENT
PRECIPITATION	39.25	4792943.000	100.00
RUNOFF	6.731	821953.437	17.15
EVAPOTRANSPIRATION	23.377	2854669.000	59.56

					4
	š.				
PERC	./LEAKAGE THROUGH LAYER 2	9.779118	1194159.370	24.91	
AVG.	HEAD ON TOP OF LAYER 2	0.0100			
PERC	./LEAKAGE THROUGH LAYER 4	9.140528	1116179.120	23.29	
CHAN	GE IN WATER STORAGE	0.001	142.542	0.00	
SOIL	WATER AT START OF YEAR	33.890	4138386.000		
SOIL	WATER AT END OF YEAR	33.891	4138528.500		
SNOW	WATER AT START OF YEAR	0.000	0.000	0.00	
SNOW	WATER AT END OF YEAR	0.000	0.000	0.00	
ANNU	AL WATER BUDGET BALANCE	0.0000	-0.932	0.00	
*****	**********	******	******	******	
*****	**********************		*******	*****	
	ANNUAL TOTALS	FOR YEAR 1981			
		INCHES	CU. FEET	PERCENT	
PREC	IPITATION		5955460.500	100.00	
RUNOI	FF	7.454	910278.562	15.28	
EVAPO	OTRANSPIRATION	25.980	3172559.500	53.27	
PERC	./LEAKAGE THROUGH LAYER 2	15.025765	1834844.250	30.81	
AVG.	HEAD ON TOP OF LAYER 2	0.0134			
PERC.	./LEAKAGE THROUGH LAYER 4	12.520567	1528926.500	25.67	
CHANC	GE IN WATER STORAGE	2.815	343695.375	5.77	
SOIL	WATER AT START OF YEAR	33.891	4138528.500		
SOIL	WATER AT END OF YEAR	36.705	4482224.000		
SNOW	WATER AT START OF YEAR	0.000	0.000	0.00	
CNIOM	¥				
BNOW	WATER AT END OF YEAR	0.000	0.000	0.00	

0.0000

0.699 0.00

ANNUAL WATER BUDGET BALANCE

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1977 THROUGH 1981

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	5.07	3.30	4.06	3.76	3.40	2 67

	4.91	3.61	3.56	5.24	3.41	3.47
STD. DEVIATIONS	5.04 1.90	2.94 2.57	2.37	0.99 1.10	1.00 0.92	1.59
RUNOFF						
TOTALS	0.926 0.000	2.576	5.262 0.000	0.910	0.000	0.000 0.179
STD. DEVIATIONS	1.357	3.156 0.000	3.454	0.827 0.000	0.000	0.000 0.183
EVAPOTRANSPIRATION						
TOTALS	0.806 4.108	0.855 2.718	1.454 2.386	2.203 2.024	2.985 1.311	2.493 0.721
STD. DEVIATIONS	0.156 0.816	0.268 0.746		0.319 0.161	0.630 0.118	1.095 0.124
PERCOLATION/LEAKAGE	THROUGH LAYE	R 2	*			
TOTALS	0.0000 0.7969	0.0000 0.9092	0.0044 1.0211	2.6035	0.9732 1.6131	0.1375 1.8844
STD. DEVIATIONS	0.0000 0.7676	0.0000 1.1116	0.0098 1.3073	0.9240 1.2833	0.2651 0.7787	0.1679 1.6666
PERCOLATION/LEAKAGE	THROUGH LAYE	R 4				
TOTALS	1.4627 0.8383	0.9258 0.8415	0.7869 0.8031	0.6477 1.0081	0.9436 1.3165	0.9990 1.9666
STD. DEVIATIONS	0.6074 0.1425	0.3065 0.1804	0.2150 0.3022	0.1755 0.6114	0.3723 0.5836	0.1955 1.0171
AVERAGE	S OF MONTHLY	AVERAGED	DAILY HE	ADS (INCH	 ES)	
	anaaa					
DAILY AVERAGE HEAD A	CROSS LAYER	2				
AVERAGES	0.0000 0.0078	0.0000 0.0104	0.0000 0.0118	0.0437 0.0318	0.0109 0.0203	0.0016 0.0222
STD. DEVIATIONS	0.0000	0.0000 0.0128	0.0001 0.0154			0.0020 0.0204
*******	*****	*****	*****	*****	*****	*****

*******	******	*****	*****	******
AVERAGE ANNUAL	TOTALS & (ST	D. DEVIATIONS)	FOR YEARS 1977	THROUGH 1981

					JII 1501
	INCH			CU. FEET	PERCENT
PRECIPITATION	46.48	(5.864)	5675332.5	100.00
RUNOFF	9.853	(4.2646)	1203181.37	21.200
EVAPOTRANSPIRATION	24.065	(1.9670)	2938675.25	51.780
PERCOLATION/LEAKAGE THROUGH FROM LAYER 2	12.63065	(3.68132)	1542368.500	27.17671
AVERAGE HEAD ACROSS TOP OF LAYER 2	0.013 (0.005)		
PERCOLATION/LEAKAGE THROUGH FROM LAYER 4	12.53974	(2.55551)	1531268.250	26.98112
CHANGE IN WATER STORAGE	0.018	(2.0601)	2207.82	0.039

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PEAK DAILY VALUES FOR YEARS 1977 THROUGH 1981

•	(INCHES) (CU. FT.)	
PRECIPITATION	2.71 330926.781	
RUNOFF	3.193 389926.5620	
PERCOLATION/LEAKAGE THROUGH LAYER 2	2.259400 275902.53100	
AVERAGE HEAD ACROSS LAYER 2	2.638	
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.210465 25700.60940	
SNOW WATER	11.59 1415773.7500	
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4030	
MINIMUM VEG. SOIL WATER (VOL/VOL)	0.0452	

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FINAL WATER STORAGE AT END OF YEAR 1981

LAYER	(INCHES)	(VOL/VOL)
1	2.5981	0.2165
2	3.1840	0.3980
3	0.5761	0.1440
4	30.3474	0.0723
SNOW WATER	0.000	

TABLE 4. DEFAULT SOIL, WASTE, AND GEOSYNTHETIC CHARACTERISTICS

	Classification	on	Total Porosity	Field Capacity	Wilting Point	Saturated Hydraulic Conductivity
HELP	USDA	USCS	vol/vol	vol/vol	vol/vol	cm/sec
1	CoS	SP	0.417	0.045	0.018	1.0x10 ⁻²
2	S	SW	0.417	0.062	0.024	5.8x10 ⁻³
3	FS	SW	0.457	0.083	0.033	3.1x10 ⁻³
	LS	SM	0.437	0.105	0.033	1.7x10 ⁻³
4		SM	0.457	0.103	0.058	1.0x10 ⁻³
5	LFS		0.457	0.190	0.035	7.2x10 ⁻⁴
6 7	SL	SM SM	0.433	0.190	0.104	5.2x10 ⁴
350	FSL		0.473	0,232	0.116	3.7x10 ⁻⁴
8	· L	ML		0.232	0.115	1.9x10 ⁻⁴
9	SiL	ML	0.501	0.244	0.136	1.2x10 ⁴
10	SCL	SC	0.398		0.130	6.4x10 ⁻⁵
11	CL	CL	0.464	0.310	0.187	4.2x10 ⁻⁵
12	SiCL	CL	0.471	0.342		3.3x10 ⁻⁵
13	SC	SC	0.430	0.321	0.221	2.5x10 ⁻⁵
14	SiC	СН	0.479	0.371	0.251	1.7x10 ⁻⁵
15	С	CH	0.475	0.378	0.265	
16		ier Soil	0.427	0.418	0.367	1.0x10 ⁻⁷
17		Mat (0.6 cm)	0.750	0.747	0.400	3.0x10 ⁻⁹
18		pal Waste or 312 kg/m³)	0.671	0.292	0.077	1.0x10 ⁻³
19		pal Waste and dead zones)	0.168	0.073	0.019	1.0x10 ⁻³
20	[,] Drainage	Net (0.5 cm)	0.850	0.010	0.005	1.0x10 ⁺¹
21	G	ravel	0.397	0.032	0.013	3.0x10 ⁻¹
22	r.	ML	0.419	0.307	0.180	1.9x10 ⁻⁵
23	SiL*	ML	0.461	0.360	0.203	9.0x10 ⁻⁶
24	SCL'	SC	0.365	0.305	. 0.202	2.7x10 ⁻⁶
25	CL'	CL	0.437	0.373	0.266	3.6x10 ⁻⁶
26	SiCL'	CL	0.445	0.393	0.277	1.9x10 ⁻⁶
27	SC*	SC	0.400	0.366	0.288	7.8x10 ⁻⁷
28	SiC*	CH	0.452	0.411	0.311	1.2x10 ⁻⁶
29	C,	CH	0.451	0.419	0.332	6.8x10 ⁻⁷
30		g Electric Plant y Ash	0.541	0.187	0.047	5.0x10 ⁻⁵
31		g Electric Plant om Ash	0.578	0.076	0.025	4.1x10 ⁻³
32		al Incinerator y Ash [*]	0,450	0.116	0.049	1.0x10 ⁻²
33		opper Slag*	0.375	0.055	0.020	4.1x10 ⁻²
34		Net (0.6 cm)	0.850	0.010	0.005	3.3x10 ⁺¹

Moderately Compacted

(Continued)

TABLE 2.2

Tighe & Bond, Inc.

Landfill Cap Barrier Layer - Hydraulic Conductivity Estimates Old Amherst Landfill CSA Study

		187						Q.		9
ASTM Method D5084	Hydraulic Conductivity	(cm/sec)	1.4E-04	2.7E-06	8.5E-05	8.4E-05	2.7E-04	3.4E-04	1.5E-04	1.1E-04
hod D1557	Optimum	(% H2O)	13.0%	XX	XXX	XXX	XXX	XXX	arrier Layer =	arrier Layer =
ASTM Method D1557	Maximum	Ury Density (lbs./ft3)	120.0	XX	XXX	XXX	XX	XXX	ty of the Cap B	ty of the Cap B
N. Company	Soil Description	(Geotecnnical Japoratory)	Brown Silty Sand	Yellowish Brown Silty Sand	timated Hydraulic Conductivity of the Cap Barrier Layer =	timated Hydraulic Conductivity of the Cap Barrier Layer =				
	Barrier Layer	Deptn (inches bg)	12-19	12-18	9-18	8-15	9-15	10-15	Average Estimated	Median Estimated
	Soil Sample	* 127	Test Hole #25	Test Hole #102	Test Hole #121	Test Hole #136	Test Hole #149	Test Hole #163		

Samples Collected Nov. 17, 2005. Barrier layer sample recovery may have been compromised by heavy rains causing puddling in test holes.

TABLE 2.1 - Landfill Test Hole Data Old Amherst Landfill Belchertown Road (Route 9), Amherst, MA

Station ID	Depth	Data collected September 20, 21 and 27, 2005 Soil Description	% LEL	%02	H2S	PID - VOCs
	(inches)	8.502	200		(ppm)	(ppm)
1	Ground Cover	6 - 8" Grass and weeds				
260	0-3"	Dark brown very fine sand, trace silt, trace small gravel				
	3-6"	Dark brown very fine sand, trace silt				
	6-12"	Dark brown very fine sand, trace silt				
	12-15"	Light brown/yellow very fine sand, trace silt	0	22.5	0	0.2
	15-24"	Grey silt and clay (dry)				0.2
6	Ground Cover	8-10" Grass and weeds				
#X	0-4"	Dark brown very fine sand, trace silt, trace small gravel				
	4-11"	Dark brown very fine sand, trace silt				
	11-13"	Light brown very fine sand, trace silt	0	22.6	0	0
	13-24"	Grey clay and silt (moist)				
9	Ground Cover	6-8" Grass and weeds				
ŭ	0-8"	Dark brown very fine sand, trace silt				
	8-13"	Light brown/yellow very fine sand, trace silt	0	22.6	0	0
	13-23"	Grey silt and clay (dry)	-	22.0		-
	23-25"	Light brown very fine sand, trace silt				
14	Ground Cover	8-10" Grass and weeds				Ì
3	0-5"	Dark brown very fine sand, trace silt				
	5-12"	Light brown very fine sand, trace silt				
	12-24"	Light grey silt and clay (dry)	0	21.8	0	0.4
	24-25"	Dark grey very fine sand and trace silt		21.0	-	
19	Ground Cover	8-10" Grass and weeds				
10	0-6"	Dark brown very fine sand, trace silt				
	6-13"	Light brown very fine sand, trace silt	0	22.6	0	0
	13-21"	Grey clayey silt (dry)	0	22.0	0	-
	21-36"	Light brown very fine sand, trace silt				
25	Ground Cover	6-8 Grass and weeds				
20	0-6"	Dark brown very fine sand, trace silt				
	6-12"	Light brown very fine sand, trace silt	0	22.7	0	0.3
	12-19"	Grey clayey silt (dry)	U	22.1	0	0.5
	21-36"	Light brown very fine sand, trace silt				
30	Ground Cover	6-8" Grass and weeds			_	
30	0-6"	Dark brown very fine sand, trace silt			-	
	6-12"	Light brown very fine sand, trace silt	0	22.6	0	0.5
	12-17"	Grey silt and clay (dry)	0	22.0	0	0.0
	17-25"	Light brown fine sand, trace silt				
33	Ground Cover	8-18" Grass and weeds				
00	0-10	Dark brown very fine sand, trace silt, trace small gravel				
	10-15"	Light brown very fine sand, trace silt.	0	22.7	0	0
	15-24"	Grey clay and silt (moist)	- 0	22.1	0	-
38	Ground Cover	6-8" Grass and weeds				
	0-6"	Dark brown very fine sand, trace silt				
	6-12"	Light brown very fine sand, trace silt	0	22.8	0	0
	12-24"	Grey silt and clay (dry)	0	22.0		
	24-28"	Light brown fine to medium sand, trace silt, trace small gravel	-			
42	Ground Cover	6-8" Grass and weeds				
	0-6"	Brown very fine sand, trace silt				
1	6-12"		0	22.0	0	0
	12-24"	Light brown/orange very fine sand, trace silt Clayey silt, some very fine sand	0	22.8	0	0

	TABLE 2.1 - Landfill Test Hole Data	
	Old Amherst Landfill	
	Belchertown Road (Route 9), Amherst, MA	
	Data collected September 20, 21 and 27, 2005	
iss	s and weeds	
	c	i

1000000		Belchertown Road (Route 9), Amherst, MA Data collected September 20, 21 and 27, 2005				
47	Ground Cover	6-12" Grass and weeds				
	0-6"	Dark brown very fine sand, trace silt				
	6-12"	Light brown very fine sand, trace silt	0	22.6	O	0
	12-21"	Grey silt and clay (dry)				
	21-24"	Light brown very fine sand, trace silt				
52	Ground Cover	6-8" Grass and weeds				
	0-6"	Brown very fine sand, trace silt				
	6-12"	Light brown very fine sand, trace silt	0	22.9	0	0
	12-17"	Light brown fine sand, some clayey silt (dry)				
	17-24"	Light brown very fine sand, trace silt				
57	Ground Cover	6-10" Grass and weeds				
0.	0-6"	Brown very fine sand, trace silt				
	6-12"	Light brown very fine sand, trace silt	0	22.9	0	0
	12-19"	Grey silt and clay , trace fine sand (dry)				
	19-24"	Light brown fine sand, trace silt				
62	Ground Cover	6-8" Grass and weeds				
02	. 0-8"	Light brown very fine sand, trace silt	0	22.6	0	0
	8-15"	Grey clayey silt (dry)				
	15-19"	Light brown very fine sand, trace silt				
68	Ground Cover	6-8" Grass and weeds				*
00	0-6"	Brown very fine sand, trace silt				
	6-12"	Light brown/orange very fine sand, trace silt	0	22.8	0.	0
	12-20"	Silt and clay, trace fine sand (dry)				
	2-26"	Light brown fine sand, trace silt				
73	Ground Cover	6-8" Grass and weeds				
73	0-6"	Brown very fine sand, trace silt	,			
	6-15"	Light brown very fine sand, trace silt	0	22.7	0	0
	15-27"	Grey clay and silt (moist)				
	27-32	Light brown fine sand				8 8
78	Ground Cover	6-8" Grass and weeds				
70	0-6"	Brown very fine sand, trace silt				
	6-12"	Light brown very fine sand, trace silt	0	22.8	0	0
	12-17"	Fine sand, some clayey silt (dry)	U	22.0		
80	Ground Cover	6-8" Grass and weeds				1
80	0-8"	Brown very fine sand, trace silt				
	8-14"	Light brown very fine sand, trace silt	0	22.9	0	0
	14-22"	Light brown sand, some clayey silt	- 0	22.0		
	22-28"	Light brown/yellow very fine sand, trace silt				
85	Ground Cover	8-10" Grass and weeds				
00	0-4"	Brown very fine sand, trace silt				
	4-11"	Light brown very fine sand, trace silt	0	22.6	0	0
	11-18"	Grey silt and clay (dry)	- 0	22.0		
	18-26"	Light brown very fine to medium sand, trace silt				
00	Ground Cover			+		
90	0-4"	8-12" Grass and weeds Dark brown very fine sand, trace silt				
			0	22.8	0	0
	4-7" 7-12"	Light brown very fine sand, trace silt	0	22.0	U	U
		Light brown fine sand, some clayey silt (dry)				
07	12-24"	Light brown fine sand, trace silt		-		
97	Ground Cover	8-10" Grass and weeds		-		
	0-8"	Brown very fine sand, trace silt		00.7		0
	8-15"	Light brown very fine sand, trace silt	0	22.7	0	0
	15-19"	Grey clay and silt (moist)				

		TABLE 2.1 - Landfill Test Hole Data				
		Old Amherst Landfill				
		Belchertown Road (Route 9), Amherst, MA				
		Data collected September 20, 21 and 27, 2005				
102	Ground Cover	6-8" Grass and weeds				
1,0.2	0-6"	Dark brown very fine sand, trace silt				
	6-12"	Light brown very fine sand, trace silt	0	22.9	0	0
	12-18"	Clayey silt, trace fine sand				
	18-24"	Light brown fine sand, trace small gravel				
109	Ground Cover	6-10" Grass and weeds				1
100	0-4"	Brown very fine sand, trace silt				
	4-12"	Light brown very fine sand, trace silt	0	22.6	0	0
	12-18"	Light brown very fine sand, some clayey silt (dry)				
	18-30"	Brown fine to medium sand, trace small gravel, trace glass				
114	Ground Cover	6-8" Grass and weeds				
114	0-4"	Brown very fine sand, trace silt				
	4-9"	Light brown very fine sand, trace silt	0	22.7	0	0
	9-15"	Light brown very fine sand, trace sit				-
	15-24"	Brown fine sand, trace silt, trace brick and glass		-		
440	Ground Cover	6-8" Grass and weeds				
116	0-4"	Brown very fine sand, trace silt			-	
	() - (1/2)		0	22.6	0	0
	4-12"	Grey fine sand trace silt, trace clay	- 0	22.0		-
	12-18"	Brown fine sand, trace silt, trace small gravel		1		±)
	18-24"	Light brown fine sand, trace small gravel		+		
121	Ground Cover	6-8" Grass and weeds		1		
	0-5"	Brown very fine sand, trace silt			_	
	5-9"	Light brown very fine sand, trace silt	0	22.7	0	0
	9-18"	Light brown very fine sand and clayey silt (dry)		1		
	18-24"	Brown fine sand, trace silt, trace glass				
128	Ground Cover	6-8" Grass and weeds				
	0-4"	Brown very fine sand, trace silt				
20	4-9"	Light brown very fine sand, trace silt	0	22.7	0	0
	9-15"	Grey clayey silt (dry)				
	15-24"	Brown fine sand, trace silt				
136	Ground Cover	4-6" Grass and weeds				
	0-5"	Brown very fine sand, trace silt				
	5-8"	Light brown very fine sand, trace silt	0	22.8	0	0
	8-15"	Light brown very fine sand and clayey silt (dry)			E.	
	15-24"	Brown very fine sand, trace silt				
141	Ground Cover	6-8" Grass and weeds				
	0-5"	Brown very fine sand, trace silt				t
	5-9"	Light brown very fine sand, trace silt	. 0	22.7	0	0
	9-15"	Light brown very fine sand and clayey silt (dry)				
	15-24"	Light brown fine sand, trace silt				
144	Ground Cover	4" Grass	IC			
	0-8"	Brown very fine sand, trace silt	0	22.8	0	0
	8-12"	Light brown/yellow fine sand, trace silt (dry)				
<u> </u>	12-24"	Light brown fine to medium sand, trace silt, trace small gravel				•
149	Ground Cover	4-8 " Grass and weeds				
	0-4"	Brown very fine sand, trace silt		e a		
81 ₄	4-9"	Light brown very fine sand, trace silt				
	9-15"	Light brown very fine sand and clayey silt (dry)				
200	15-24"	Brown fine sand, trace silt				×

TABLE 2.1 - Landfill Test Hole Data Old Amherst Landfill Belchertown Road (Route 9), Amherst, MA

		Data collected September 20, 21 and 27, 2005				
156	Ground Cover	6-8" Grass and weeds		(4)		
ŧ	0-4"	Brown very fine sand, trace silt				
	4-9"	Light brown very fine sand, trace silt	. 0	22.6	0	0
	. 9-15"	Grey light brown clayey silt (dry)				
	15-20"	Brown fine to medium sand, trace silt		-		
	20-24"	Brown fine to medium sand, trace silt, trace wood debris		,		
163	Ground Cover	6-8" Grass and weeds				
100	0-4"	Brown very fine sand, trace silt				
	4-10"	Light brown very fine sand, trace silt	0	22.6	0	0
	10-15"	Grey/ light brown very fine sand and clayey silt (dry)				
	15-24"	Light brown fine sand, trace silt				
168	Ground Cover	8-10" Grass and weeds				
100	0-26"	Brown very fine sand, trace silt, some small gravel	0	22.9	0	0
169	Ground Cover	8-10" Grass and weeds				
100	0-5"	Brown very fine sand, trace silt				
	5-11"	Light brown very fine sand, trace silt	0	22.6	0	0
	11-16"	Grey fine sand, some clayey silt (dry)				
	16-26"	Brown fine sand, trace clay, trace tar, trace glass				
174	Ground Cover	4-6" Grass and weeds	Ì			
10 11	0-4"	Brown very fine sand, trace silt				
20	4-9"	Light brown very fine sand, trace silt	0	22.7	0	0
	9-16"	Light brown very fine sand and clayey silt (dry)				
	16-24"	Light brown fine to coarse sand, trace silt				
	24-28"	Land fill debris				
179	Ground Cover	6-8" Grass and weeds				
110	0-4"	Brown very fine sand, trace silt				
- 2	4-8"	Light brown very fine sand, trace silt, trace small gravel	0	22.6	0	0
	8-13"	Light brown very fine sand, trace silt				
	13-18"	Brown fine sand, trace silt			1	
	18-24"	Light brown fine to coarse sand, trace silt				
184	Ground Cover	4-8" Grass and weeds				
101	0-30"	glass fragments and evidence of urban fill	0	22.9	0 -	0
189	Ground Cover	4-8" Grass and weeds				
100	0-36"	Light brown very fine sand, trace silt	0	22.9	0	0
193	Ground Cover	Sparse moss, clumps of 2-3" grass				
	0-30"	Light brown very fine sand, trace silt	0	22.9	0	0
197	Ground Cover	Sparse moss, and grass			· ·	
	1-42"	Light brown very fine sand, trace silt	- 0	22.9	0	0
205	Ground Cover	Sparse dried moss				
	0-1"	Brown very fine sand, trace silt				
	1-30"	Light brown very fine sand and clayey silt (dry)	0	22.9	0	0
207	Ground Cover	Thick moss and pine saplings				
	1-30"	Light brown very fine sand, trace silt	0	22.8	0	0

^{1) %} LEL, % O₂, H₂S (ppm) and PID - VOC (ppm) data collected within the test hole above the landfill cap layer.

²⁾ Bold descriptions indicate landfill cap barrier layer characterization.

Geo-Environmental, LLC Drilling contractors

115 Main Street P.O. Box 646 Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

wen #:	1-08	Start:	0/10/2008	Finish:	6/16/2008	

Sheet: 1 of 1

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: _____
Drill/Crew: J.M.

Auge 4.2	er Size 5"ID	C	Casing Si	ze	S	ampling 5'		Core Bar	rel	Utility Clearance Town Permit #:	#:
Sample No.	Depth Range	0-6	Blows 6-12	per 6 "	10.24	REC.	Strata			Lithology/Ren	
110.	Range	0-0	0-12	12-18	18-24		Chang	е			
S-1	0-2'	1	1	2	2	6"		Topsoil. DR	RY		
S-2	5-7'	10	22	28	25	18"		Tan mediun	n-coars	e SAND and GRAVEI	DRY
S-3	10- 12'	11	20	27	28	13"		Brown med	ium-co	arse SAND, some grav	el. WET
S-4	15- 17'	22	24	50 5"		18"		Brown med	ium SA	ND, little coarse sand,	little gravel. WET
S-5	18- 20'	12	24	34	36	15"				e SAND and SILT, litt um SAND, little silt, tr	
								EOB 20'		WATER @) 10'
								2" PVC We	ll Set @) 18'	
								Screen		18-8'	
								Riser Filter Sand		8-+3' 18-6'	
								Bentonite S	eal	6-4'	
								Native Fill		4-2'	
					THE STATE OF			Standpipe/C	Concrete	At Surface	- n
										D.	
						<u> </u>					
 F	ield Obs.	Only	Su	mp	FT	Dia	0		E(14	er Sand 300#	Concrete 6 bgs
	Portions U										
,	Trace: 0-1	10%	- 1	reen <u>10</u> I			a.		Bei	ntonite 50#	Flush
	Little: 10- Some: 20-		Ris	ser <u>11'</u> Ft	. <u>2"</u> Dia.				Bei	ntonite	Stand Up <u>4"x5'</u>
	And: 350:		En	dcaps 1	Expansio	n Plug <u>1</u>			Por	tland	Misc

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Belchertown, MA 01007

Well #: <u>2-08</u> Start:	6/16/2008	Finish:	6/16/2008
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Sheet: 1 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: _____
Drill/Crew: J.M.

Utility Clearance #: ____ Auger Size Core Barrel Casing Size Sampling 4.25"ID Town Permit #: _____ Blows per 6 " Sample Depth Strata Lithology/Remarks REC. Range 0-6 6-12 12-18 18-24 Change 0-5" Topsoil. 5-12" Brown fine SAND, little silt, coarse sand, 12" S-1 0-2' 5 8 15 3 trace gravel. MOIST 0" No Recovery, spoon DRY S-2 5-7' 50 Gray/tan fine SAND and GRAVEL, little coarse sand. DRY S-3 10-11 24 31 23 10" 12' 6" Gray medium SAND, little gravel. DRY S-4 15-5 5 17' Gray/brown fine-medium SAND, trace gravel. DRY S-5 20-3 4 7 12" 6 22' Gray/brown fine SAND. MOIST S-6 25-2 6 11 10 15" 27' S-7 9 14" Gray/brown fine-coarse SAND, little gravel. DRY 30-11 12 12 32' Gray/brown fine-coarse SAND, little gravel. DRY S-8 14" 35-3 12 13 13 37' Gray/brown fine-medium SAND, little coarse sand, gravel. DRY S-9 40-9 18 12" 15 18 42' Gray/brown fine-medium SAND, little gravel. DRY S-10 45-8 18" 6 13 12 47' Gray fine SAND, trace medium sand. MOIST 19" 12 16 S-11 50-52' S-12 14 27 18 45 0" No Recovery, spoon DRY 55-57' Field Obs. Only Sump ____ FT. ___ Dia. ____ Filter Sand Concrete Portions Used Flush _ Screen ____ Ft. Slot Dia. Bentonite Trace: 0-10% Little: 10-20% Stand Up ' Riser_Ft._Dia. Bentonite ____ Some: 20-35% Misc. Endcaps _ Expansion Plug Portland And: 35050%

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Belchertown, MA 01007

Well #: 2-08 Start: 6/16/2008 Finish: 6/16/2008

Sheet: 2 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Depth Range 60-62'	0-6	6-12	per 6 " 12-18						
60- 62'		2 14600	12-18		REC.	Strata	-	Lithology/Rema	rks
62' 65-	5			18-24		Change			
		14	22	23	21"		Brown/Gray fir	ne-medium SAND, little coa	rse sand, gravel. DRY
67'	8	13	15	20	22"		Gray fine SAN	D, trace silt. MOIST	
70-	7	13	15	23	17"		Gray fine SAN	D. DRY	
72'									
75- 77'	4	4	6	8	23"		Gray fine SAN	D, trace silt. WET	
80- 82'	6	13	14	14	24"		Gray fine SAN	D, trace silt. WET	
							EOB 83'	WATER @ 75'	
							2" PVC Well S	et @ 83'	
							Screen Riser	83-73' 73-+3'	
							Filter Sand Bentonite Seal	83-71' 71-69'	
							Native Fill	69-2'	
						-			
race: 0-1 ttle: 10-2 me: 20-3	0% 20% 35%	Scr Ris	een <u>10</u> F er <u>76</u> Ft.	t. <u>010</u> Sl <u>2"</u> Dia.	ot <u>2"</u> Di			Bentonite <u>50#</u> Bentonite	Concrete 6 bags Flush Stand Up 4"x5' Misc
it	72' 75- 77' 80- 82' d Obs. rtions Uace: 0-1 le: 10-2 ne: 20-3	72' 75- 4 77' 80- 6 82'	72' 75- 4 4 77' 80- 6 13 82' d Obs. Only rtions Used ace: 0-10% le: 10-20% ne: 20-35%	72' 75- 4 4 6 77' 80- 6 13 14 82' d Obs. Only tions Used ace: 0-10% cle: 10-20% ne: 20-35% Endows 1 L	72' 75- 4 4 6 8 77' 80- 6 13 14 14 82' d Obs. Only tions Used ace: 0-10% lle: 10-20% ne: 20-35% Riser 76 Ft. 2" Dia. Endeand 1 Functions Inc. 20-35%	72' 75- 4 4 6 8 23" 80- 6 13 14 14 24" 82' d Obs. Only rtions Used ace: 0-10% le: 10-20% ne: 20-35% Findence 1 Five process Plant 1	72' 75- 4 4 6 8 23" 80- 6 13 14 14 24" 82' 82' 80- 6 13 15 14 15 24" 82' 82' 82' 82' 82' 82' 82' 82' 82' 82'	72' 75- 4 4 4 6 8 23" Gray fine SAN 80- 6 13 14 14 24" Gray fine SAN 82' EOB 83' 2" PVC Well S Screen Riser Filter Sand Bentonite Seal Native Fill Standpipe/Cond 4 Obs. Only Tions Used ace: 0-10% le: 10-20% ne: 20-35% Riser 76 Ft. 2" Dia. Endown 1 Function Need Riser 76 Ft. 2" Dia. Endown 1 Function Need Riser 76 Ft. 2" Dia. Endown 1 Function Need Riser 76 Ft. 2" Dia. Endown 1 Function Need Riser 76 Ft. 2" Dia. Endown 1 Function Need Riser 76 Ft. 2" Dia.	72'

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Belchertown, MA 01007

Well #: 3-08 Start: 6/17/2008 Finish: 6/17/2008

Sheet: 1 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Auge 4.25	r Size	C	Casing Siz	ze	S	ampling 5'		Core I	Barre	1	Utility Clearand Town Permit #:	
Sample	Depth		Blows	per 6 "		REC.	Strata				Lithology/R	
No.	Range	0-6	6-12	12-18	18-24	REC.	Change				Emologyin	omarko
S-1	0-2'	2	7	12	12	20"					Brown fine SAND	, little medium sand, gravel,
								trace sil	t. DR	Y		
S-2	5-7'	7	10	8	9	22"	П	Brown/	gray 1	nediur	n SAND, little coar	rse sand, gravel. DRY
S-3	10- 12'	2	4	5	6	18"	П	Brown	fine-n	nediun	n SAND, little grav	el. MOIST
S-4	15-	5	4	7	5	24"		Gray/br	own i	fine SA	AND, trace gravel.	MOIST
S-5	20-	3	4	5	5	18"		Gray/br	own :	fine SA	AND, trace silt. DR	Y
S-6	25- 27'	4	5	6	8	22"		Brown	fine S	SAND,	, little medium sand	l, trace gravel. DRY
S-7	30- 32'	7	13	20	23	14"		Gray fi	ne SA	ND at	nd GRAVEL, little	coarse sand, DRY
S-8	35- 37'	5	7	9	9	20"		Brown/	gray	fine-m	edium SAND, little	e coarse sand, gravel. MOIST
S-9	40- 42'	3	8	7	8	17"		Gray/b	rown	fine-m	nedium SAND, trac	e coarse sand, trace gravel. DRY
S-10	45- 47'	6	10	12	11	16"		Gray/b	rown	fine S.	AND, some coarse	sand, trace gravel. DRY
S-11	50- 52'	4	10	12	18	21"		Brown	fine-ı	mediui	m SAND, trace coa	rse sand, gravel. DRY
S-12	55- 57'	6	7	10	15	17"		Brown	fine S	SAND	, little silt, trace coa	arse sand. DRY
-	Ciald Ol	On1			Ear	D:				17:1	Iter Sand	Concrete
	Field Obs Portions				_ FT							200 Start V = 25
	Trace: 0	-10%	- 1		Ft	Slot_ D	ıa.				entonite	Flush
	Little: 10		R	iser_Ft.	_ Dia.						entonite	Stand Up `
	Some: 20 And: 350		* E	ndcaps_	Expansion	on Plug				Po	ortland	Misc

Geo-Environmental, LLC Drilling contractors

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Belchertown, MA 01007

Well #: 3-08 Start: 6/17/2008 Finish: 6/17/2008

Sheet: 2 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

	er Size 5"ID	(Casing Siz	ze	S	ampling 5'		Core Barrel	Utility Clearance Town Permit #:	
Sample	Depth			per 6 "		REC.	Strata		Lithology/Re	marke
No.	Range	0-6	6-12	12-18	18-24	Tabo.	Change		Ethology/Re	marks
S-13	60-	7	12	5	11	18"		Brown fine SA	AND, trace coarse sand, g	ravel. DRY
S-14	65- 67'	4	9	10	11	20"	10	Gray/brown fi	ne SAND, trace coarse sa	and, gravel. DRY
S-15	70- 72'	4	10	16	21	21"		Brown fine-m	edium SAND, trace silt, g	ravel. DRY
S-16	75- 77'	4	6	11	14	20"		Gray/brown n	nedium SAND, some coa	rse sand, little gravel, trace silt.
S-17	80- 82'	1	1	2	3	24"		Brown/gray m	edium SAND, some coar	se sand, little gravel. WET
S-18	83- 85'	2	4	8	14	18"		Brown mediur	m SAND, some fine sand,	trace coarse sand, gravel. WET
	00							EOB 85'	WATER @	75'
								2" PVC Well S	Set @ 83'	
								Screen Riser	83-73' 73-+3'	1
								Filter Sand Bentonite Seal	83-70' 1 70-68'	
								Native Fill	68-2'	
								Standpipe/ Co	ncrete At Surface	,
		_				_				
				- 1						
]	ield Obs. Portions I Trace: 0-	Used		mp reen <u>10</u> I			8		Filter Sand 300# Bentonite 50#	Concrete 6 bgs Flush
I	Little: 10-	-20%	Ris	ser <u>76</u> Ft	. <u>2"</u> Dia.		7 4 11		Bentonite	Stand Up <u>4"x5'</u>
	Some: 20- And: 350		En	dcaps 1	Expansio	n Plug <u>1</u>		ž.	Portland	Misc

Geo-Environmental, LLC **Drilling contractors**

Casing Size

115 Main Street P.O. Box 646

Auger Size

Tel: (413) 323-8700

Sampling

Belchertown, MA 01007

Fax (413) 323-0200

Well #: 4-08 Start: 6/18/2008 Finish: 6/20/2008

Sheet: 1 of 3

Client: Tighe & Bond Inspector: J.M.P.

Utility Clearance #: _

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____ Drill/Crew: J.M.

Core Barrel

4.25			asing 512 HW (4")		3	5'		NQ-2				
Sample	Depth		Blows	per 6 "		REC.	Strata		Lithology/Remarks			
No.	Range	0-6	6-12	12-18	18-24	REC.	Change	1				
S-1	0-2'	2	1	2	4	12"		Brown fine SAND, little coarse sand, trace gravel. DRY				
S-2	5-7'	10	15	6	18	4"		Brown fine SAND, little coarse sand, trace gravel. DRY				
S-3	10- 12'	8	8	10	13	12"		Brown/gray fine-medium SAND, some coarse sand, little gravel, trace silt. WET				
S-4	15- 17'	1	1	1	1	6"		Brown fine-medium SAND, little coarse sand, silt. WET				
S-5	18- 20'	6	6	6	7	11"		Brown fine SAND	, little sil;t. WET			
S-6	23- 25'	4	5	7	8	12"		Brown fine SAND, trace gravel, silt. WET				
S-7	28- 30'	5	5	8	8	10"		Brown fine SAND	, little gravel, trace silt. WI	ET		
S-8	33- 35'	1	2	4	4	14"		Brown fine-mediu	m SAND. WET			
S-9	38- 40'	4	5	13	24	24"		Brown medium SA	AND, little coarse sand, trace	ce silt. WET		
S-10	43- 45'	2	2	4	8	20"		Brown fine SAND	and SILT, trace clay. WE	Γ		
S-11	48- 50'	4	5	9	13	24"		Brown coarse SA	ND, some medium sand, tra	ace gravel. WET		
S-12	53- 55'	100				3"		Red/brown weathered, pulverized micaceous arkosic sandstone.				
I	ield Obs	. Only	Sı	.mp	FT	Dia	ı	Fi	lter Sand	Concrete		
	Portions	Used		creen_F			,	Be	entonite	Flush		
	Trace: 0- Little: 10		- 1	iser Ft.				В	entonite	Stand Up		
	Some: 20 And: 350		E	ndcaps _	Expansio	n Plug		Po	ortland	Misc		

Geo-Environmental, LLC **Drilling contractors**

115 Main Street P.O. Box 646

Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: 4-08 Start: 6/18/2008 Finish: 6/20/2008

Sheet: 2 of 3

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: _____ Drill/Crew: J.M.

Auger Size Casing Size Utility Clearance #: ____ Sampling Core Barrel 4.25"ID HW (4") NQ-2 Town Permit #: Blows per 6 " Sample Depth Strata REC. Lithology/Remarks No. Range 0-6 6-12 12-18 18-24 Change S-13 58-100 2" Red/brown weathered, pulverized, micaceous ARKOSIC 60' 1.5" SANDSTONE bedrrock. WET S-14 63-100 1" Red/brown weathered, micaceous ARKOSIC SANDSTONE bedrock. 1" 65' WET S-15 68-100 No Recovery, spoon WET 0" 70' 1.5" 73-S-16-100 Red/brown weathered micaceous ARKOSIK SANDSTONE bedrock. 1" 1" S-17 73-100 1.5" (3" spoon for resample) red/brown weathered ARKOSIC 75' 2" SANDSTONE Bedrock. WET Roller Bit to 78' min/ft C-1 78-45" Red Arkosic Sandstone 3 831 3 4 3 3 C-2 83-3 56" Red Arkosic Sandstone 88' 3 3 4 4 C-3 88-3 51" Red Arkosic Sandstone 93' 4 3 4 4 EOB 93' WATER @ 12' Field Obs. Only Sump ____ FT. ___ Dia. __ Filter Sand Concrete Portions Used Screen Ft. Slot Dia. Bentonite Flush Trace: 0-10% Little: 10-20% Riser Ft. Dia. Bentonite Stand Up Some: 20-35% Endcaps _ Expansion Plug Portland Misc. And: 35050%

Geo-Environmental, LLC Drilling contractors

115 Main Street P.O. Box 646 Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: $\underline{4-08}$ Start: $\underline{6/18/2008}$ Finish: $\underline{6/20/2008}$

Sheet: 3 of 3

Client: Tighe & Bond Inspector: J.M.P.

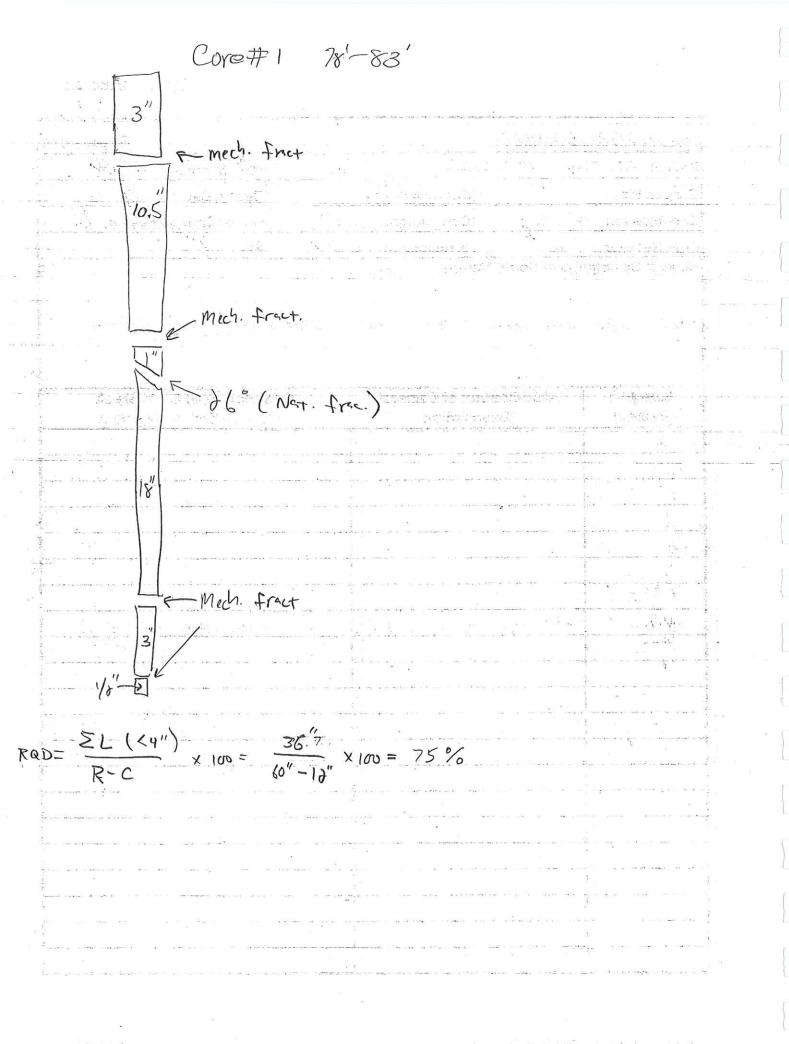
Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

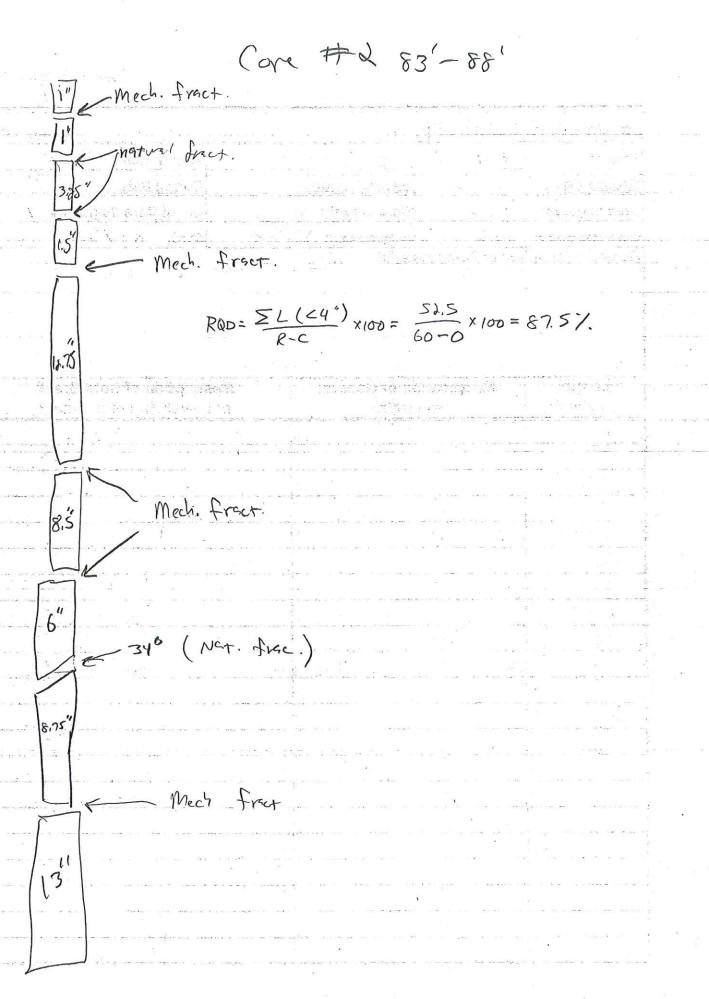
Well Locus: ____

Auger 4.25	r Size "ID	Casing S HW (4"		g Size Sampling (4") 5'				Core Barrel Utility Clearance #: NQ-2 Town Permit #:		#: 		
Sample No.	Depth Range	0-6	Blows 6-12	per 6 "	18-24	REC.	Strata Change	11	Lithology/Remarks			
			0 12	12.10	10 2 .							
				-		-		Core hole was rea	amed out from 78-93' wi	th 3 7/8" carbide roller		
								bit, flushed with o				
								2" PVC Bedrock	Well Set @ 93'			
								Screen	93-83'			
								Riser	83-+3' 93-81'			
								Filter Sand Bentonite Seal	81-71'			
	-								Bentonite Grout 71-3'			
				-				Standpipe/Concrete @ Surface				
		i.						- FF - SW	O 2001			
				<u> </u>								
				-								
										4		
				-								
			-	-	-	-	-					
			-	-			-					
							1	*				
	ield Obs		Sı	ımp	_ FT	Dia	١	I	Filter Sand 100#	Concrete 6 bags		
	Portions		S	creen 10	Ft. 010	Slot 2"	Dia.	1	Bentonite 25#	Flush		
	Trace: 0- Little: 10		- 1					1	Bentonite	Stand Up 4"x5'		
	Little: 10 Some: 20			iser <u>86</u> F								
	And: 350		E	ndcaps <u>1</u>	Expansion	on Plug <u>l</u>	_	I	Portland 3 bag	Misc		

	* ° ; *	<u></u>		9	1/3	
ROCK CORE	SUMMARY	5 5.55 % & 1.561 # #	man Panta Kina	STREET, R. D. A. LA	Sheet 1 of	
Project: A-030	8 Old Ar	nherst landfi	1)	Well Number:	1-08	
Ground Elev.:	*:	Bedrock Depth:		Coring Date: 6 - 19 - 08		
Core Interval: 7	8'-83'	Core Length:	011	No. of Core Segm	ents: 6	
Core Recovery:	36"	% Recovery: 6	0%			
General Descript	ion of Cored Ma	aterial: R/B	r Arkos	1 C Sand ston	2	
squess o			= 220			
used NQ2	core barrell	1: 1D= 1.99"	OD=	1.97" (Per Mike	Martin)	
	x x-		-		2 Accept 10 15 Accept 10 15 Accept 10 15 Accept 10 Accep	
	(1) 			w - 3	· #	
Length	Parties.	on of General		scription of Core		
(inches)	Desc	cription	at	Lower End of Se	gment	
		ensigned				
10,5"				0	36	
18"				= =		
8"	2			a)	9	
3"						
0.5"	1		*			
NA	NId" care 1	00: 1	1000	TA 00 0 PAC 5	cia M :	
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			2	7	•)	
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		24	(#	8		
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		. 232		=	•	
				10		



ROCK CORE	SIIMMADV				Sheet 1 of		
		1	,,				
	08 Old Am	herst Landfi					
Ground Elev.:	-1	Bedrock Depth:	Coring Date: 6-19-08				
Core Interval: 8		Core Length: 60		No. of Core S			
Core Recovery:		% Recovery: 87	.5%		15%		
General Descript	ion of Cored M	aterial: R/B	Arkasic	Sandston	genani .		
	#5			-0 707	erenen su		
				· -			
	300				A 8 20 4		
					2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Length	Modificati	on of General	Des	scription of C	ore Break		
(inches)	Des	cription	at	Lower End of	Segment		
1."			. 6021 2022 2				
3.75"							
1,5"			* // =	Ag di			
12.75"			,	V V			
8.5"		0		-			
6"				£ (1)			
8.75"	±	- V	5				
13"		2/9					
	one les	+ in boreholi at		TsOod	"E 38 of		
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19	-21	*	×		*		
					592 S		
					# 1		



Tighe & Bond, Inc. 3/3

Teles test to		
ROCK CORE SUMMARY	₹ 	_Sheet 1 of 1
Project: A-0308 Old	Amherst Land fill	Well Number: 4-08
Ground Elev.:	Bedrock Depth:	Coring Date: 6-19-08
Core Interval: 88'-93'	Core Length: 55"	No. of Core Segments:
Core Recovery: 50.25%	% Recovery: 83.75%.	RQD: 91.36%
General Description of Cored I	Material: R/Br. Ar465	ic Sandsjon

Length (inches)	Modification of General Description	Description of Core Break at Lower End of Segment				
16.75"	e i e a decidada e de					
17 "		and the first telephone control of the telephone and the second				
3"						
9"						
10"	8	± 11 ± 16				
NA	5" core left in bores	le after coris per Tale				
	5" core left in bores.	0				
	(A)	La				
		3-				
8						
		4,7				
	8.	· Live · ·				
		27				
		es, se				
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	ν,	*.				
Q 12	·					

16.25" 12"

 $RAD = \sum L (24") \times 100 = \frac{50.75}{60"-5} \times 100 = 91.36 \%$

mech. frut.

Massachusetts Department of Conservation and Recreation Office of Water Resources

157458

TYPE OR PRINT ONLY

Well Completion Report

WELL	LOCA	TION	GPS	(Required) No	rth 🛫	20	2	<i>L</i> :.	2 1	<u> </u>	West _	72° 2	9.1	06
Address	at Well	Location	n:	LO DELCHE	RIGH	WRD	Proper	ty Ov	vner/Clie	nt:	14/1	WRST L	ANG F	14
1	ion Nam								ress:				N. V.	
itv/Tow	/n:			AMHERS	<i>[</i> .		Citv/To	wn: _		· A191	4015	T MA.		
R				Assessors Lot #: .									eet address	available
1	•			de Green -		t Regu						Date I		1
2. WOR				WELL TYPE		_	-		ГНОБ	6. CASI				
							ourden	-	Bedrock	From (ft)	- No. 10) Type	Thickness.	Diameter
(4	W		MON	T	14	R	1	<i>i</i>	0	158		177	614
5. WELL	. LOG	LOG OVERBURDEN Water			Loss or Drop in Extra				1 11 11 11					
(6)	T- ((1)			LITHOLOGY		of Flu	작용하게 되는 사람들	Orill tem	Slow	7. SCRI	EEN			
rom (ft)			Color	Comment	Zone	- Y /(Ñ.			Drill Rat	-From (ft)	To (ft) Type	Slot Size	Diameter
ن	-20	50	70			_		/(Ñ	F/(\$					- 27
10	4 0	56	Yp.			Y /	100	/ N	F/S	-1				
40	60	56	7 B			Y /(-	10	F/S	-1				
60	10	90	YB			Y /		/(N	F/S	_ O. Aillio	LAR SE	AL/FILTER PACI	K/ABANDONN	MENT MTL.
10	100	96	YB			Y /		/ N	F/S		To (ft) Material D	escription	Purpose
164	120	SICL	-			Y /		/ N	F/S					
120	13).	5166	1/8			Y /(/ (Ñ						
						Y /	NY	/ N						
						Y /	NY	/ N	F/S				Ц	
WELL	LOG	vvaler				Drop in			or VISIDI	e Loss or	# 01	9. SITE SKETC	H	
[F (6)	T- (4)			OLOGY	Bearing Drill Large Sk Zone Stem Chips Drill I				Hust					1
From (ft)		Code		Comment				7.5.5. A. W.						
135	210	54	,	we walks			-	-		V Y / N			2. 2	
								-		N Y V				
								-		V Y / N				
										N Y V				1
								_		N Y V	-			
-								_		N Y V	_			
								-		V / N				
		-		- 12-100	- 0					V / N				
									_	N Y / N				1
0. WEI	LTEST	DATA (ALI S	ECTIONS MAND	ATORY						11 9	TATIC WATER	LEVEL (ALL	WELLS
Date	Meth		Yield (GPM)	Time Pumped (hrs & min)	Pumpin (Ft. I	g Level	Time I	and the same	over	Recovery (Ft. BGS)	T	te Measured	Depth E Ground Su	Below
7/9/00			0	1-118		0.h.	140	_		0	-	908	2104	
7 100	7.10	<u> </u>				41.				· ·	<u> </u>	7 = 0	- 1 - pa	
2 DER	NAMEN	T DIIMD	/IE AN	AILABLE)		The Section of the		-		13 ADD	ITIONA	L WELL INFO	RMATION	
	***************************************		(11 /4)									Fracture Er		VIK
Pump De				(ft) Nominal P	ump Ca	Horse _l pacity			(gpm)			Surface Sea		
4. COM	MENTS	A	1441	toking me	916	ONO	-4					n 210 #Dep		
15. WEL			100	n	iles and	regulati	ons, an	d this	report is	pandoned u	inder m	y supervision, ac	ccording to ap	plicable
∂riller:	2 im	ر عدد	Brie	Super	vising D	riller Siç	gnature	:	Packe	No.	e Ekkon 	- Registrati	on #:L//	1311
Firm:	The	A.c.	إييلتت	Edday (福祉.	D	ate Co	mole	te·	7/9/6	8	Ria Permi	it # 1014	151 1

Martin Geo-Environmental, LLC

293 North Liberty St P.O. Box 646 Belchertown, MA 01007

Invoice

Date	Invoice #
7/29/2008	1246

P.O. No.	Terms	Project
task# 03-015-158	NET 30 DAYS	Amherst, MA

Quantity	Description	Rate	Amount
158 1 1 5	Drill Rig / Crew, Air Rotary/Mud Drilling, 210' TD Steel Casing, 6" 158' Mob/Demob Drive Shoe Seal 6" Bentonite GEL Drilling Mud Well Cap 6"	15.00 15.00 500.00 50.00 15.00 65.00	3,150.00 2,370.00 500.00 50.00 75.00 65.00
	Work Dates: 7/9-10/08 Old Amherst Landfill, Amherst, MA		
121			
	· · · · · · · · · · · · · · · · · · ·		
		-	
		= ==	
5% Discount if paid in	full within 15 days	Total	\$6,210.00

Geo-Environmental, LLC Drilling contractors

115 Main Street P.O. Box 646

Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: 6-08 Start: 8/11/2008 Finish: 8/12/2008

Sheet: 1 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: _____ Drill/Crew: M.M.

Auger Size Casing Size Sampling Utility Clearance #: ____ Core Barrel 4.25"ID HW Town Permit #: Blows per 6 " Sample Depth Strata REC. Lithology/Remarks No. Range 0-6 6-12 12-18 18-24 Change S-1 0-2' 8 11 10 9 3" Topsoil, Rock in spoon tip. DRY S-2 5-7' 11 14 19 18 15" Brown fine SAND, trace medium sand, silt DRY S-3 10-5 12 12 23" Gray CLAYEY SILT. MOIST 12' S-4 15-2 3 5 24" Gray CLAY, trace silt. WET 17' S-5 20-24" 5 Gray SILTY CLAY. WET 22' Pulled HSA, Installed HW Casing S-6 25-3 Gray SILTY CLAY, WET 24" 27' S-7 30-4 5 19" 5 7 Gray CLAY and SILT, trace very fine sand. WET 32' S-8 35-4 4 5 24" 5 0-12" Gray CLAY and SILT, trace very fine sand. 37' 12-24" Brown SILT, some very fine sand, trace clay. WET S-9 40-16 10 25 24" Brown very fine-fine SAND, little silt. WET Sump ____ FT. ___ Dia. ___ Field Obs. Only Filter Sand Concrete Portions Used Screen ____ Ft. Slot Dia. Bentonite Flush Trace: 0-10% Little: 10-20% Riser_Ft._Dia. Bentonite ____ Stand Up ` Some: 20-35% Endcaps _ Expansion Plug Portland Misc. And: 35050%

Geo-Environmental, LLC Drilling contractors

115 Main Street P.O. Box 646 Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: 6-08 Start: 8/11/2008 Finish: 8/12/2008

Sheet: 2 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst landfill #: A=0308-7-02

Location: Amherst, MA

Well Locus: ____

Auger 4.25		C	asing Siz			ampling 5'		Core Barrel Utility Clearance #: Town Permit #:				
Sample No.	Depth Range	0-6	Blows 6-12	per 6 " 12-18	18-24	REC.	Strata Change	Lithology/Remarks				
									7.13TD	1		
S-10	45-	16	47	53	39	20"			SAND, trace medium sand			
	47'							16-20" Brown fine	SAND and GRAVEL. W	EI		
S-11	50-	30	100			9"		Red/brown very fir	ne SAND, some silt, little	gravel, coarse		
3-11	52'	30	4"					sand, trace clay. (till) WET				
								2.11	GAND	ul vilt torax alor		
S-12	51-	128	121	100		13"			ne SAND, some gravel, li	ttle siit, trace clay		
	53'			1"				WET				
								EOB 51.5'	WATER @ 10'			
								2" PVC Well Set (@ 50'			
								Screen 50-40'		2		
								Riser	40-+3'			
								Filter Sand	50-38'			
								Bentonite Seal	38-35'			
								Cement/Bentonite				
								Native Fill	4-2'			
								Standpipe/Concre	te at Surface			
	Field Obs	Only		ump	FT	Di	a.	F	ilter Sand 100#	Concrete 6		
	Portions	Used		creen 10				1	Sentonite 25# chips	Flush		
	Trace: 0 Little: 10)-20%		Liser <u>43</u> I				В	Sentonite 25# GEL	Stand Up 4"x5"		
	Some: 20 And: 35		E	indcaps <u>1</u>	Expansi	on Plug	1	P	ortland <u>2</u>	Misc		

Geo-Environmental, LLC Drilling contractors

115 Main Street P.O. Box 646

Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: 7-08 Start: 8/12/2008 Finish: 8/12/2008

Sheet: 1 of 1

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: _____
Drill/Crew: M.M.

	er Size 5"ID	C	Casing Si	ze	S	ampling 5'	-	Core Barre	Utility Clearance Town Permit #:	#:		
Sample	Depth			per 6 "		REC.	Strata					
No.	Range	0-6	6-12	12-18	18-24	ICC.	Change		Lithology/Remarks			
S-1	0-2'	8	10	10	12	12"		0-4" Topsoil, MOIST	4-12" brown fine-medium	SAND, little gravel, trace silt		
S-2	5-7'	15	22	21	22	12"		Brown fine Sa	AND, little silt, trace mediu	m sand. MOIST		
S-3	10- 12'	4	8	12	13	24"		Gray CLAY,	trace silt. MOIST			
S-4	15- 17'	2	3	5	6	24"		Gray CLAY,	trace silt. MOIST			
								EOB 17'	WATER @ 4'			
								2" PVC WEL	L SET @ 15'			
								Screen Riser	15-5' 5-+3'			
								Filter Sand Bentonite Seal				
								Standpipe/Cor	acrete at Surface			
Ī	Portions Used Trace: 0-10% Little: 10-20% Rise		een <u>10</u> F er <u>8</u> Ft. <u>2</u>	p FT Dia en <u>10</u> Ft. <u>010</u> Slot <u>2</u> Dia. r <u>8</u> Ft. <u>2"</u> Dia.			6 ° 1	Filter Sand 300# Bentonite 50# chips Bentonite	Concrete 6 bags Flush Stand Up 4"x5'			
Some: 20-35% And: 35050%		End	dcaps 1 E	Expansion	ı Plug <u>1</u>			Portland	Misc			

Geo-Environmental, LLC Drilling contractors

115 Main Street P.O. Box 646 Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: 8-08 Start: 8/12/2008 Finish: 8/12/2008

Sheet: 1 of 1

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Auger 4.25	Size "ID	C	Casing Siz		Sa	ampling 5'		Core Barrel	Utility Clearance #: Town Permit #:	
Sample No.	Depth Range	0-6	Blows 6-12	per 6 "	18-24	REC.	Strata Change		Lithology/Remark	s
110.	Kange	0-0	0-12	12-10	10-24		Change			
S-1	0-2'	1	3	3	7	7"		Brown fine-med	ium SAND. DRY	
S-2	5-7'	7	3	11	14	10"		Gray/brown very	y fine-fine SAND, trace silt. I	MOIST
S-3	10-	5	6	9	8	13"		Brown very fine	e-fine SAND, trace silt. WET	
3-3	12'	3	U		0	13				
S-4	15- 17'	5	10	10	12	13"		Brown very fine	e-fine SAND, trace silt. WET	
								EOB 17'	WATER @ 7'	
								2" PVC WELL	SET @ 15'	
								Screen	15-5'	
								Riser	5-+3'	30
								Filter Sand	15-3'	
								Bentonite Seal	3-2'	
								Standpipe/Conc	erete at Surrace	
	-						-			
			-				-			
			-	-			-			
							-			
-	Field Obs	Only		 ump	FT	Di	<u> </u>		Filter Sand 350#	Concrete 6 bags
	Portions			creen 10					Bentonite 50# chips	Flush
	Trace: 0						na.		Bentonite	Stand Up <u>4"x5'</u>
	Little: 10 Some: 20			Riser <u>8</u> Ft Dia. <u>2"</u>						10 5
	Some: 20-35% And: 35050%			indcaps <u>1</u>	Expansi	on Plug	<u>l</u>		Portland	Misc

Geo-Environmental, LLC Drilling contractors

115 Main Street P.O. Box 646 Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: 9-08 Start: 8/12/2008 Finish: 8/18/2008

Sheet: 1 of 4

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Auge: 4.25	ger Size Casing Size 25"ID HW				S	ampling 5'		Core Barrel		Utility Clearance #: _ Town Permit #:	
Sample No.	Depth Range	0-6	Blows 6-12	per 6 " 12-18	18-24	REC.	Strata Change			Lithology/Remark	CS .
										N.	
S-1	0-2'	2	2	2	3	7"		Brown fine-me	edium	SAND, little coarse sand	1. MOIST
<u> </u>								-			
		71						1			
S-2	5-7'	2	8	16	17	16"		Brown fine-ve	ry fin	e SAND, little medium sa	and, trace gravel, silt. WE
0.2	10	11	10	10	10	011		N. D.		WED	
S-3	10- 12'	11	19	13	13	0"		No Recovery,	spoon	WEI	
	12										
S-4	15-	5	10	8	11	24"		Brown fine SA	ND,	trace silt. WET	
	17'										
								-			
S-5	20-	7	9	11	19	23"		Brown fine SA	ND 1	little very fine sand, trace	coarse sand silt WET
5-5	22'	,	,	11	19	23		Blown fine 374	uvD,	ntile very fine sailu, trace	coarse sailu, siii. WE1
									1		
_ S-6	25-	10	7	8	12	15"		Brown fine-ve	ry fin	e SAND, trace silt. WET	
	27'							-			
							_	-			
S-7	30-	8	8	13	13	12"		Brown fine-ve	ry fine	e SAND, trace silt. WET	
	32'									• • • • • • • • • • • • • • • • • • • •	
	2.5	1.5		10	10	440		D	~	GAND that it wom	
S-8	35- 37'	15	11	13	19	11"		Brown fine-ve	ry fine	e SAND, little silt. WET	
	31					-		-			
S-9	40-	12	17	18	24	14"		Brown fine-ve	ry fine	e SAND, trace silt. WET	
	42'										
	Q1							-			
F	ield Obs.	Only	Su	mn	ET	Dia.		1	E(1+	er Sand	Concrete
	Portions I			470 St.			No. 100 (100 (100 (100 (100 (100 (100 (100				
	Trace: 0-		Sc	reen	Ft S	Slot_ Dia	a.		Ben	tonite	Flush
	Little: 10-		Ris	ser_Ft	Dia.				Ben	tonite	Stand Up `
	ome: 20- And: 350		En	dcaps_ I	Expansion	n Plug			Port	land	Misc

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115 Main Street P.O. Box 646

Tel: (413) 323-8700 Fax (413) 323-0200

Belchertown, MA 01007

Well #: 9-08 Start: 8/12/2008 Finish: 8/18/2008

Sheet: 2 of 4

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Auge: 4.25	r Size	C	Casing Siz HW	e	Sampling 5'			Core E	Barrel	Utility Clearance #: Town Permit #:	
Sample	Depth	0.6		per 6 "	10.04	REC.	Strata			Lithology/Remark	S
No.	Range	0-6	6-12	12-18	18-24		Change				
S-10	45-	11	7	7	11	15"				very fine SAND, little silt.	
	47'							10-15" E	Brown very	y fine SAND, some silt, cla	yey silt in tip. WET
S-11	50- 52'	12	8	12	19	15"		Brown v	ery fine S	AND, some silt. WET	
S-12	55- 57'	9	7	11	20	16"		Brown f	ine-very fi	ine SAND, some silt, little	clay. WET
S-13	60-	13	15	20	21	10"		Brown f	ine-very f	ine SAND, trace silt. WET	
S-14	65- 67'	21	29	31	28	16"		Brown f	ine-very f	ine SAND, little silt. WET	7
S-15	70- 72'	13	15	26	27	15"		Brown f	ine-very f	ine SAND, little silt, clay.V	VET
S-16	75- 77'	15	14	.14	17	13"		Brown f	ine-very f	ine SAND, little silt. WET	
S-17	80- 82'	16	25	31	41	13"		Brown	ĩne-very f	ine SAND, trace silt, clay.	WET
S-18	85- 87'	9	11	14	19	16"		20000000000000000000000000000000000000	Gray very lens @ 13	fine SAND, some silt, trace	e clay. WET
I	 Field Obs	. Only	Sı	lmp	FT.	Dia	a		F	ilter Sand	Concrete
	Portions	Used		reen						entonite	Flush
	Trace: 0- Little: 10		- 1	iser_Ft.		25/)			В	entonite	Stand Up `
	Some: 20 And: 350		- 1	ndcaps_		n Plug			P	ortland	Misc

Geo-Environmental, LLC Drilling contractors

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Belchertown, MA 01007

Well #: 9-08 Start: 8/12/2008 Finish: 8/18/2008

Sheet: 3 of 4

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

	r Size 5"ID	C	asing Si	ze	5	ampling 5'		Town Permit #:				
Sample	Depth		Blows	s per 6 "		DEG	Strata			T '41 1 - /D - 1	==	
No.	Range	0-6	6-12	12-18	18-24	REC.	Change			Lithology/Remark	S	
0.10	00		1.5	1.5	- 10	440		D /6	~	CAND "II.	1 WPT	
S-19	90- 92'	14	15	17	19	11"		Brown/Gray ve	ery fine	e SAND, some silt, trace	clay. WEI	
S-20	95-	12	14	23	23	13"		Grav very fine	SAND	and SILT, trace clay. V	VET	
5 20	97'	12	13	25	23	15		Citaly (city take)	0.1.	and 5221, and 5111, 1		
				-								
-												
S-21	100-	14	21	27	37	14"		Gray/Brown ve	ery fine	e SAND, some silt, trace	clay. WET	
	102'			-				 				
			INDS:									
S-22	105- 107'	10	11	25	42	18"				e SAND, trace silt. edium SAND, trace silt,	gravel, WET	
	107							.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,	Bruttu (122	
S-23	110-	9	17	38	74	16"		0-14" Brown fi	ne SA	ND, little silt, trace coar	se sand gravel	
5-23	112'	,	17	36	74	10				AND, trace medium sand		
								in spoon tip. W	ΈT		a)	
S-24	115-	8	11	16	31	19"		Gray very fine	SAND	D, little silt. WET		
	117'							(3" layer very		and and coarse sand, fine	gravel,little silt	
								@ 12")				
S-25	120-	13	17	25	32	19"				little silt, trace clay, with	ı clay lens	
	122'							throughout . W	ET			
				+								
S-26	125-	10	7	10	9	20"), little silt. trace clay, w	ith clay lens	
	127'			-				throughout. WE	ET			
S-27	130- 132	19	31	2.5"		9"				m-coarse SAND WET rock fragments. WET	11	
	132			2.3				3-9 Red weath	icica i	ock flagments. WET		
	ield Obs.		S	ump	_ FT	Dia	•		Filte	r Sand	Concrete	
	Portions Trace: 0-		S	creen	Ft	Slot_ Di	a.	,	Bent	onite	Flush	
1	Little: 10	-20%	R	iser_Ft.	Dia.				Bent	onite	Stand Up `	
	Some: 20 And: 350		E	ndcaps_ 1	Expansio	n Plug			Portl	and	Misc	

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Belchertown, MA 01007

Well #: 9-08 Start: 8/12/2008 Finish: 8/18/2008

Sheet: 4 of 4

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

4.25		D HW			S	ampling 5'		Core Barrel	Town Permit #:		
Sample	Depth		Blows	s per 6 "			Strata				
No.	Range	0-6	6-12	12-18	18-24	REC.	Change			Lithology/Remark	CS .
S-28	131-	141	100			1"		Red GRAVEL	and o	coarse SAND (WASH) W	/ET
	132'										
		1						EOB 131.5'		WATER @ 7'	
-								2" PVC WELL	SET	@ 131'	
		-									
										101 1011	
								Screen Riser		131-121' 121-+3'	
								Filter Sand		131-118.5	
						1		Bentonite Seal		118.5-116'	
								Cement/Benton			
								Native Fill		5-2'	
								Standpipe/Con	crete	at Surface	
_											
								-			
								-			
	ield Obs.		Sı	ımp	_ FT	Dia.			Filte	er Sand <u>150#</u>	Concrete 6 bags
	Portions I Trace: 0-		So	creen <u>10</u> 1	Ft. <u>010</u> S	lot <u>2"</u> D	ia.		Ben	tonite 25# chips	Flush
	ittle: 10-		R	ser 1124	Ft. 2" D	ia.			Ben	tonite <u>100#</u>	Stand Up 4"x5'
	ome: 20-										Misc
And: 35050% Endcaps 1 Expansion Plug 1 Portland 4 Misc											

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Belchertown, MA 01007

Well #: 10-08 Start: 8/18/2008 Finish: 8/20/2008

Sheet: 1 of 3

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

r Size 5"ID	C	Casing Siz HW	ze	S	ampling 5'		Core Barrel	Utility Clearance #: _ Town Permit #: _	
Depth Range	0.6			19.24	REC.	Strata		Lithology/Remark	
Range	0-0	0-12	12-10	10-24		Change			
0-2'	1	5	8	3	6"		Topsoil, DRY		
5-7'	3	12	12	13	15"		0-4" Topsoil, 4-15	"Brown very fine SAND,	little silt
10-	8	12	14	15	24"		Brown fine SAND	, some very fine sand, trac	e silt. WET
12'									
15- 17'	4	3	3	6	8"		Brown fine SAND	, little very fine sand, trace	coarse sand. WET
20- 22'	10	9	9	11	11"				d, silt. WET
25- 27'	11	8	10	11	6"		Gray fine SAND,	trace gravel. WET	ı
30- 32'	13	21	27	23	13"				
35- 37'	28	34	33	37	0"		No Recovery, spoo	on WET	
40-	15	25	36	33	10"				sand, trace silt.
		Su	imp	_ FT	Dia	· <u> </u>	Fi	Iter Sand	Concrete
		Sc	reen	Ft	Slot_ Di	a.	Be	entonite	Flush
Little: 10-	-20%	Ri	ser_Ft.	Dia.			Ве	entonite	Stand Up _
Some: 20- And: 350				_	n Plug				Misc
	Depth Range 0-2' 5-7' 10- 12' 15- 17' 20- 22' 25- 27' 30- 32' 35- 37' 40- 42' Sield Obs. Portions Trace: 0- Little: 10- Some: 20-	Depth Range	HW Blows Blows Color Color	HW Blows per 6 " Blows per 6 " Depth Range 0-6 6-12 12-18	Blows per 6 " Blows per 6	Blows per 6 " REC.	Blows per 6 "	TID	Town Permit #: Blows per 6 "

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Belchertown, MA 01007

Well #: $\underline{10\text{-}08}$ Start: $\underline{8/18/2008}$ Finish: $\underline{8/20/2008}$

Sheet: 2 of 3

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

	r Size 5"ID	C	Casing Siz	ze	S	ampling 5'		Core Barrel	Utility Clearance #: _ Town Permit #:	
Sample No.	Depth Range	0-6	Blows 6-12	per 6 " 12-18	18-24	REC.	Strata Change	Lithology/Remarks		
S-10	45-	22	35	34	36	16"		Gray SILT and CI	AV WET	
3-10	47'		33	34	30	10		Gray SILT and CI	LAI. WEI	
S-11	50-	18	33	48	45	16"			little clay. 9-16" brown very	y fine SAND and SILT.
	52'							WET		
S-12	·55- 57'	58	65	87	90	13"		Brown very fine S	SAND, trace fine sand, grav	el. WET
S-13	60- 62'	70	66	90	72	13"		Brown very fine S	SAND, little silt, some clay	lens. WET
S-14	65- 67'	50	65	71	67	12"		Brown very fine S	SAND and SILT, trace clay.	. WET
S-15	70- 72'	47	62	69	57	11"		Gray/brown fine-v	very fine SAND, little silt.	WET
S-16	75- 77'	51	84	73	79	15"		Gray/brown very	fine SAND, trace silt. WET	,
S-17	80- 82'	10	14	20	. 43	24"		Brown medium-co	parse SAND (WASH) WE	T
S-18	85- 87'	14	7	9	19	14"		Gray fine-very fin	e SAND, little medium san	d. WET
F	Field Obs.	Only	Su	mp	ET	Dia		E	ilter Sand	Concrete
	Portions Trace: 0-	Used		reen					entonite	Flush
]	Little: 10- Some: 20-	-20%	1	ser_Ft				1	entonite	Stand Up _
	And: 350		En	dcaps_ I	Expansio	n Plug		Pe	ortland	Misc

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Belchertown, MA 01007

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Well #: 10-08 Start: 8/18/2008 Finish: 8/20/2008

Sheet: 3 of 3

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: Drill/Crew: M.M.

Auger Size Casing Size Utility Clearance #: Sampling Core Barrel 4.25"ID HW Town Permit #: _____ Blows per 6 " Sample Depth Strata REC. Lithology/Remarks No. Range 6-12 12-18 18-24 Change S-19 90-11 21 71 100 15" 0-12" Gray fine-very fine SAND, trace silt. 92' 2" 12-15" gray/red very fine SAND, little silt, gravel, trace clay. WET 2" weathered rock (sandstone) in spoon tip. EOB 91.5' WATER @ 6' 2" PVC WELL SET @, 90' Screen 90-80' 80-+31 Riser Filter Sand 90-77.5' Bentonite Seal 77.5-74.5' Cement/Bentonite Grout 74.5-4' 4-2' Native Fill Standpipe/Concrete at surface Field Obs. Only Sump ____ FT. ___ Dia. Filter Sand 150# Concrete 6 BAGS Portions Used Screen 10 Ft. 010 Slot 2" Dia. Bentonite 25# CHIPS Flush Trace: 0-10% Little: 10-20% Riser 83 Ft. 2" Dia. Bentonite 50# gel Stand Up 4"X5' Some: 20-35% Endcaps 1 Expansion Plug 1 Portland 4 Misc. And: 35050%

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Belchertown, MA 01007

Well #: 11-08 Start: 8/21/2008 Finish: 8/21/2008

Sheet: 1 of 1

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Auge 4.25	r Size 5"ID	C	Casing Siz	e	Sa	ampling		Core B	arrel	Utility Clearance #: Town Permit #:	<u> </u>
ample	Depth			per 6 "		REC.	Strata			Lithology/Rema	rks
No.	Range	0-6	6-12	12-18	18-24		Change				
								NO SOII	. SAMPI	LING REQUIRED, COM	PLETED ON MW-10-08
								2" PVC	WELL S	ET @ 14'	4
								Screen		14-4'	
								Riser		4-+3' 14-3'	
X.								Filter San Bentonite		3-2'	
										te at Surface	
										77.37 1.0012.50	
						M.					
	-										
			-								
			-								
1	Field Obs	Only		l mp	FT	Dia		L	Г	ilter Sand 300#	Concrete 6 bags
									- 1		70
	Portions Used Trace: 0-10% Screen <u>10</u> Ft. <u>010</u> S					Slot <u>2"</u> I	Dia.		E	Bentonite 25# chips	Flush
	Little: 10	-20%	Ri	ser <u>7</u> Ft.	<u>2"</u> Dia.				E	Bentonite	Stand Up <u>4"x5"</u>
	Some: 20		E	idcaps 1	Expansio	on Plug 1			P	ortland	Misc
	And: 350)50%		Toubo T			-				

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Well #: 12-08 Start: 8/20/2008 Finish: 8/20/2008

Sheet: 1 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____ Drill/Crew: M.M.

	4.25"ID HW 5'				ampling 5'		Core Barrel	Utility Clearance #: Town Permit #:		
Sample	Depth		Blows	per 6 "			Strata		10	
No.	Range	0-6	6-12	12-18	18-24	REC.	Change		Lithology/Rema	rks
S-1	0-2'	5	6	7	10	16"		0-2" Topsoil, 2-1	6" Brown very fine SAND	. little silt, trace clay
								DRY		,
					-					
S-2	5-7'	5	5	9	8	20"		Brown very fine	SAND and SILT, little clay	v. WET
S-3	10-	3	3	8	6	16"		Brown very fine	SAND and SILT, little clay	fine sand WET
	12'									, me said. WE1
										*
S-4	15-	2	4	7	8	18"			ne SAND and SILT, little c	
	17'								fine SAND and SILT, littl	e clay. WET
								(2 1" bands of fir	ne-medium sand.)	
S-5	20-	16	14	19	24	24"		0-7" brown very	fine SAND and SILT, little	clay
	22'				-21	21			SAND, little coarse sand, t	
										8
C (25	12	0.1	1.0		2011				
S-6	25- 27'	13	21	17	23	22"		Brown fine SANI	D, trace gravel. WET	
	21									
S-7	30-	14	19	20	11	17"		Brown very fine	SAND, trace silt. WET	
	32'									
S-8	35-	5	6			1.40		D		
3-0	37'	3	0	6	5	14"		Brown fine SANI	D, little very fine sand, trace	e gravel. WET
S-9	40-	23	24	20	18	17"		Brown fine SANI), trace medium sand, very	fine sand. WET
	42'									
	eld Obs.	Only	C111		ET	Dia		l D'	11. G 1	
	Portions U			mp		, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Fi	ilter Sand	Concrete
	Frace: 0-		Scr	een _ Ft.	_ Slot_	Dia.		В	entonite	Flush
I	ittle: 10-	20%	Ris	er_Ft	Dia.			В	entonite	Stand Up
	ome: 20-		End	dcaps_ E	xpansion	Plug			ortland	Misc.
F	And: 350:	JU70				0		1.		

Geo-Environmental, LLC Drilling contractors

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Belchertown, MA 01007

Well #: 12-08 Start: 8/20/2008 Finish: 8/20/2008

Sheet: 2 of 2

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Auge 4.25	r Size 5"ID	C	Casing Siz	ze	S	ampling 5'		Core Barrel	Utility Clearance #: Town Permit #:			
Sample No.	Depth Range	0-6	Blows 6-12	per 6 " 12-18	18-24	REC.	Strata Change		Lithology/Remarks			
0.10	45	12	24	22	14	2411		Gray SILT, trace	olay WET			
S-10	45- 47'	13	24	22	14	24"		Gray Sill1, trace	Clay, WE1			
S-11	50-	16	18	21	12	6"		Grav SII T little	to trace clay. (clay lens at	8")		
5-11	52'	10	10	21	12	U		Gray GET, Indie	to trace oray, (oray rons ar	· ,		
S-12	-55-	11	13	18	11	16"		Gray very fine S.	AND, trace clay, silt. WET			
	57'							-				
S-13	58- 60'	200				4"		Red Sandstone fi	ragments in spoon tip. WE	Γ		
								EOB 58' W	ATER @ 6'			
								2" PVC WELL S	SET @ 57'			
								Screen Riser	57-47' 47-+3'	Barrier and the second		
								Filter Sand	57-45'			
								Bentonite Seal Cement/Bentoni				
								Native Fill Standpipe/Concr	4-2' ete at Surface			
a												
1	Field Ob-	Onler		<u> </u>	ET	D:-			Filter Sand 150#	Concrete 6 bags		
	Field Obs. Only Sump FT. Portions Used Trace: 0.10% Screen 10 Ft. 010								Bentonite 25# chips	Flush		
Little: 10-20% Riser <u>50'</u> Ft. 2									Bentonite 25# GEL	Stand Up 4"x5"		
Same: 20 350/				ndcaps 1	Expansi	on Plug <u>1</u>			Portland <u>3</u>	Misc		

Martin

Geo-Environmental, LLC Drilling contractors

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Belchertown, MA 01007

Well #: PGW-8 Start: 6/17/2008 Finish: 6/17/2008

Sheet: 1 of 1

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Drill/Crew: J.M.

4.25			Casing Siz	ze	S	ampling 5'		Core Barrel	Barrel Utility Clearance #: Town Permit #:				
Sample	Depth		Blows	per 6 "		DEC	Strata			I :411/D			
No.	Range	0-6	6-12	12-18	18-24	REC.	Change			Lithology/Rema	rks		
S-1	0-2'	2	6	7.	7	8"		Brown Topsoil.	l. DRY				
S-2	5-7'	3	4	21	18	9"		Tan fine-mediu	um SAND	, some gravel, trace	e silt. DRY		
S-3	10- 12'	7	19	18	27	12"		Gray/brown me	edium-coa	arse SAND, some g	ravel, trace silt. DRY		
S-4	15-	7	8	3	5	13"		Gray/brown me	edium SA	ND, some fine sand	d, trace silt, gravel. DRY		
	17'										, , g		
								EOB 17'		No Water			
								2" Gas Well Se	et @ 15'				
								Screen		15-5'			
								Riser		5-+3'			
								Filter Sand		15-4'			
								Bentonite Seal		4-2'			
								Standpipe/Conc					
								Standpipercone	orete 71t B	urrace			
							-						
				*									
								-					
F	ield Obs.	Only	Su	mp	FT	Dia.			Filter Sa	and 300#	Concrete 6 bags		
	Portions U				 Ft. <u>010</u> S				Bentoni	1	Flush		
	Frace: 0- Little: 10-					101 Z D	ш.						
	ome: 20-			ser <u>8</u> Ft.		DI .		1		te	Stand Up <u>4"x5"</u>		
	And: 350.					n Plug <u>1</u>			Portland	1	Misc		

Martin

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Belchertown, MA 01007

Well #: PGW-9 Start: 6/18/2008 Finish: 6/18/2008

Sheet: 1 of 1

Client: Tighe & Bond Inspector: J.M.P.

Project: Old Amherst Landfill #: A-0308-7-02

Location: Amherst, MA

Well Locus: ____

Drill/Crew: J.M.

Auge: 4.25	r Size 5"ID	C	Casing Siz	ze	S	ampling 5'		Core Barrel	Utility Clearance #: Town Permit #:				
Sample No.	Depth Range	0-6	Blows 6-12	per 6 " 12-18	18-24	REC.	Strata Change	11	Lithology/Ren	narks			
0.1	0.01	2	11	10	10	1.411		0.100 Terreil 10	14" Drawn fina CAND	, little coarse sand, trace silt			
S-1	0-2'	3	11	12	10	14"		DRY	14 Brown Time SAND	, inthe coarse sand, trace sin			
S-2	5-7'	6	6	9	8	20"		Gray/brown fine S	AND, trace gravel, DR	RY			
S-3	10- 12'	3	5	4	5	17"		Gray/brown fine-n	nedium SAND, some c	coarse sand, little gravel. DRY			
S-4	15-	3	7	7	8	0"		No Recovery, spoo	, spoon DRY				
	17'							EOB 17'	No Water				
								2" PVC Gas Well	Set @ 15'				
								Screen Riser	15-5' 5-+3'				
								Filter Sand	15-4'				
								Bentonite Seal Standpipe/Concret	4-2' te At Surface				
				_									
	10 115	0-1			Ear	D.		Tr'	Itan Cand 200#	Congress 6 has			
	Field Obs. Portions				_ FT				ilter Sand 300#	Concrete 6 bgs			
	Trace: 0-	10%			Ft. <u>010</u> S	Slot <u>2'</u> D	1a.	1	entonite 50#	Flush			
,	Little: 10 Some: 20 And: 350	-35%		iser <u>8</u> Ft. ndcaps <u>1</u>	2" Dia. Expansion	on Plug <u>1</u>			entonite ortland	Stand Up <u>4"x5'</u> Misc			

	Tighe & Bond Amherst, MA			DR	ABOARD		Test Bori Monitor \		PGW-1
	Old Amherst	Landfill oard Drillir	a Inc		026 SPFLD, M ING/SOIL I		Sheet No	1	1 of 2
Contract	Casing	Sampler	Core Barrel		eight-lb./fall-		Start:	9/22/2005	1012
Туре	HSA	SS	N/A	-	300/24	,	Finish:	9/22/2005	
O.D. Inch	8-1/2"	33	IN/A	Rig Type:	THE RESERVE AND THE PERSON NAMED IN	Γ	Driller:	Frank Harr	ington
I.D. Inch	4-1/4"		-	Lyd Type.	D-00		Dimer.	i ialik iiali	ington
Depth (ft.)	Blows	Sample	Recovery	 	EIELD CLASS	IFICATIONS	AND REMARI	rs I	PID
Range	Per 6"	No.	Recovery	'	TIELD GLASS	IFICATIONS	AND ILLIAN		LID
0-2'	8-17-15-20	S-1	10"	Brown Very Fi	ne SAND, Tra	ce Silt, Trace	Organics, Gra	vel 0-6".	0.0
5-7'	11-14-17-15	S-2	6"	Light Brown F	ine to Medium	SAND, Trace	Silt and Small	Gravel.	0.0
10-12'	9-15-20-29	S-3	10"	Light Brown F	ine to Medium	SAND, Trace	e Silt and Small	Gravel.	0.0
15-17'	9-15-14-14	S-4	16"	Light Brown F Gravel.	ine to Medium	SAND, Trace	e Silt and Some	Small	0.0
20-21.5'	9-12-13-17	S-5	17"	Gravel.	ine-Medium S/		Silt, Trace Smal	I	0.0
22-29'	9-10-12-15	S-6	10"	Light Brown F	ine-Medium SA	AND, Trace S	Silt.		0.0
30-32'	10-12-17-21	S-7	15"	Light Brown F	ine-Medium S <i>i</i>	AND, Trace S	Silt.		0.0
	CAMPLE	ENETRATIO	N DECISTANCE	= 140 lb \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	folling 30" on 3	"OD compl	ar		
Da	THE RESERVE OF THE PERSON NAMED IN	ENEIRATIO	N RESISTANCI	the state of the s		J.D. sample	01	PROPORTIO	NS
Dens	Charles and the Control of the Contr	lumula		ve Consistence		aoft	trace		110
# of Hamm		very loose	# of Hamme		very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9		med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-2		dense	16-30	31+			and	30 to 50%	
30-49	50+	very dense	L						

	Tighe & Bone Amherst, MA Old Amherst	·		DF	EABOARD RILLING, IN 026 SPFLD, M		Test Bori Monitor \		PGW-1
Contract	or: Seab	oard Drillin	ng, Inc.	DRILL	ING/SOIL I	_OG	Sheet No		2 of 2
	Casing	Sampler	Core Barrel	Hammer (V	/eight-lb./fall-	30")	Start:	9/22/2005	
Туре	HSA	SS	N/A	140/30	300/24		Finish:	9/22/2005	
O.D. Inch	8-1/2"			Rig Type:	B-53		Driller:	Frank Harr	ington
I.D. Inch	4-1/4"						Į.	11	0.5
Depth (ft.)	Blows	Sample	Recovery	1	FIELD CLASS	IFICATIONS	AND REMAR	(S	PID
Range	Per 6*	No.							
40-42'	10-12-15-22	S-9	18"	Grey/Light Bro	own Very Fine	SAND and Sil	t. (Wet).		0.0
45-47'	10-12-13-15	S-10	15"	Brown, Very F	ine SAND and	Silt (Wet).			0.0
				Well Set @ 4	5.0'.				
*									
				0.010 Slot Sc No. 1 Well SA Bentonite Sea Concrete 0-1' Completed wi	ND 3-45'. I 1-3'.	rotective Casi	ng.		
				=					
							1		
		70							
		PENETRATIO	N RESISTANCE	E - 140 lb. Wt. F	alling 30" on 2	" O.D. sample	er		
			ve Consistence				PROPORTIO	NS	
# of Hamm	er Blows	very loose	# of Hammer		very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9)	med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-2	29	dense	16-30	31+			and	30 to 50%	
30-49	50+°	very dense							

Client:	Tighe & Bon				ABOARD		Test Bori		
	Amherst, MA			II.	ILLING, IN		Monitor \	Well ID:	PGW-2
	Old Amherst			The second secon	026 SPFLD, N				
Contract		oard Drillin	-p-ll-uni-man-		ING/SOIL		Sheet No		1 of 2
	Casing	Sampler	Core Barrel		eight-lb./fall-	30")	Start:	9/22/2005	-
Туре	HSA	SS	N/A	The second second second second	300/24	γ	Finish:	9/22/2005	
O.D. Inch	8-1/2"			Rig Type:	B-53	į.	Driller:	Frank Harr	ington
I.D. Inch	4-1/4"					<u></u>	<u> </u>		
Depth (ft.)	Blows	Sample	Recovery	F	FIELD CLASS	SIFICATIONS A	AND REMARI	KS	PID
Range 0-2'	Per 6"	No.	100	 	A.1115 =				
0-2	8-10-10-13	S-1	10"	Brown Very Fi	ne SAND, Tra	ce Silt, Trace (Organics.		0.0
5-7'	3-5-5-7	S-2	10"	Light Brown Vo	ery Fine SANI	D, Trace Silt.		Y E	0.0
10-12'	8-14-10-10	S-3	6"	Light Brown Vo	ery Fine SAND	D, Trace Silt.	is il		0.0
15-17'	7-14-10-10	S-4	18"	Light Brown Ve	ery Fine SAND	D, Trace Silt.			0.0
20-22'	8-11-12-12	S-5	16"	Light Brown Fi	ne-Medium S/	AND, Trace Sil	t.		0.0
25-27'	9-9-11-13	S-6	12"	Light Brown Fi	ne-Medium S/	AND, Trace Sil	t.		0.0
30-32'	13-15-16-18	S-7	19"	Light Brown Fi	ne SAND, Tra	ce Silt.			0.0
	SAMPLED	ENETRATION	I DECIČTANOS	14016 144 5	alling 201 O	10 D co	Γ		
Densi		LINETRATION	RESISTANCE		aning 30" on 2	U.D. sampler		PROPORTIO	NIC SIL
# of Hamme		von locas		ve Consistence	was safe !				VO
# or Hamme		very loose	# of Hammer		very soft /	soft	trace	0 to 10%	
		loose	0-2		med-stiff /	stiff	little	10 to 20%	
5-9		med/dense	5-8		very stiff /	hard	some	20 to 35%	
10-2		dense	16-30	31+			and	30 to 50%	
30-49	50+	very dense				L	L	1	

Ollers	Ti.L. 0.D.			CEA	BOARD		Test Bori	ng/	
Client:	Tighe & Bond Amherst, MA				LING, IN	C.	Monitor \		PGW-2
	Old Amherst			P.O. BOX 302					
		oard Drillin	na Inc	■	IG/SOIL L		Sheet No		2 of 2
Jonitiact	Casing	Sampler	Core Barrel	Hammer (We	And in case of the last of the	the state of the s	Start:	9/22/2005	
ype	HSA	SS	N/A	140/30		- /	Finish:	9/22/2005	
D.D. Inch	8-1/2"	33	THE STATE OF THE S	Rig Type: E	The second liverage and the se		Driller:	Frank Harr	ington
D. Inch	4-1/4"			Trug Typor 2					
Depth (ft.)	Blows	Sample	Recovery	FII	ELD CLASSI	FICATIONS A	ND REMAR	ks	PID
Range	Per 6"	No.	Recovery		480 01/100.				
35-37'	10-12-15-22		10"	Light Brown/Yell	low Very Fine	SAND and T	race Silt.		
40-42'	8-9-9-11	S-9	19"	Light Brown, Fir	ne SAND and	Trace Silt (W	et).	1	0.0
45-47'	8-8-9-9	S-10	11"	Brown, Very Fin	e SAND and	Silt.			0.0
				Well Set @ 45.	0'.				
				0.010 Slot Scre No. 1 Well SAN Bentonite Seal Concrete 0-1'. Completed with	ID 3-45'. 1-3'.	rotective Casi	ng.		
								-	
	CAMPLE	DENIETRATIO	NN DECISTANC	E 140 lb 144 E-	alling 30° on 3	O D cample	ar l	1	
		PENETRATIC		E - 140 lb. Wt. Fa	uning 30 on 2	. O.D. Sample	21	PROPORTIO	ONS
Den	The state of the s			ive Consistence	vonveeft /	soft	trace	0 to 10%	
# of Hamr		very loose	# of Hamme		very soft /	stiff	little	10 to 20%	
0-		loose	0-2	1	med-stiff /	199109032	10000000	20 to 35%	
5-		med/dense	5-8	200 00000	very stiff /	hard	some	30 to 50%	
10-		dense	16-30	31+			and	30 10 30 76	
30-49	50+	very dense							

	Tighe & Bond Amherst, MA Old Amherst			DF	EABOARD RILLING, IN		Test Bori Monitor \		PGW-3
		candill oard Drillin	na Inc		026 SPFLD, M ING/SOIL I		Sheet No		1 of 2
Contiduc	Casing	Sampler	Core Barrel	The Part of the Pa	Veight-lb./fall-		Start:	9/22/2005	1012
Туре	HSA	SS	N/A	man and a second	300/24	00 /	Finish:	9/22/2005	
O.D. Inch	8-1/2"	00	The state of the s	Rig Type:		T	Driller:	Frank Harr	ington
I.D. Inch	4-1/4"		 	- 1.mg 1.ypo.	D 00		J. III.	i rank riair	ington,
Depth (ft.) Range	Blows Per 6"	Sample	Recovery	11 11 2	FIELD CLASS	IFICATIONS A	AND REMARI	KS	PID
0-2'	13-17-15-15	No. S-1	6"	Brown Very F Trace Organi	ine SAND, Tra	ce Silt, Trace S	Small Gravel,		0.0
5-7'	12-18-8-9	S-2	14"	Light Brown \	ery Fine SAND), Trace Silt an	d Trace Small	l Cobbles.	0.0
10-12'	5-5-7-8	S-3	8"	Light Brown \	ery Fine SAND), Trace Silt.			0.0
15-17'	8-12-9-13	S-4	18"	Light Brown \	ery Fine SANE	D, Trace Silt.	.1		0.0
20-22'	10-5-5-4	S-5	20"	Light Brown V	ery Fine SAND), Trace Silt, D	ry.		0.0
25-27'	5-7-7-9	S-6	18"	Light Brown V	ery Fine SAND), Trace Silt.			0.0
30-32'	16-18-10-8	S-7	10"	Light Brown V	ery Fine SAND), Trace Silt. (V	Vet).		0.0
	SAMPLED	ENETRATIO	L N RESISTANCE	1 140 lb \\\/+ 5	alling 30" on 3'	"OD sampler			
Densi		EIIE I INATIO		ve Consistence		J.D. Sampler	 	PROPORTION	NS.
# of Hamme		very loose	# of Hammer		very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	med-stiff /	stiff	little		
5-9		med/dense	5-8		0.000	la see		10 to 20%	
5-9 10-2				9-15	very stiff /	hard	some	20 to 35%	
	A74	dense	16-30	31+			and	30 to 50%	
30-49	50+	very dense	L			L	L		

	Tighe & Bone Amherst, MA Old Amherst			DI	EABOARD RILLING, IN 3026 SPFLD, N	VC.	Test Bor Monitor		PGW-3
Contract	or: Seab	oard Drillii	ng, Inc.		ING/SOIL		Sheet No),	2 of 2
	Casing	Sampler	Core Barrel	Hammer (\	Neight-lb./fall	-30")	Start:	9/22/2005	
Туре	HSA	SS	N/A	140/30	300/24		Finish:	9/22/2005	
O.D. Inch	8-1/2"			Rig Type	B-53	T	Driller:	Frank Hari	rington
I.D. Inch	4-1/4"								
Depth (ft.)	Blows	Sample	Recovery		FIELD CLASS	SIFICATIONS	AND REMAR	KS	PID
Range	Per 6"	No.		1					
35-37'	8-11-13-10	S-8	24"	Light Brown	Very Fine SAN	D, Trace Silt. (Wet).		0.0
				Well set @ 3	5.0'.				
				0.010 Slot So					-
				No. 1 Well S					
		8		Bentonite Sea					
			1	Concrete 0-1					
						Protective Casir	ng.		
						1	1	er	
								I	
1									
						*		l	
		ENETRATION	RESISTANCE			" O.D. sampler			
Densit				e Consistence	-	ļ		PROPORTIO	NS
# of Hamme		very loose	# of Hammer		very soft /	soft	trace	0 to 10%	
0-4	1	loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9	1	med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-29		dense	16-30	31+	×		and	30 to 50%	l,
30-49	50+	very dense							

Project: Old Amberet Landfill Contractor: Seab-oard Drilling, Inc. Casing Sampler Core Barrel DRILLING/SOIL LOG Sheet No. 1 of 1	Client: Location	Tighe & Bon Amherst, MA		******		EABOARD RILLING, II		Test Bori		PGW-4
Casing Sampler Oce Barrel Hammer (Weight-Infall-10") Start: 9/23/2005 Finish: 9/23/2005	Project:	Old Amherst	Landfill		P.O. BOX	3026 SPFLD, I	MA 01101			
Page HSA SS N/A 140/30 300/24 Finish: 9/23/2005 Driller: Frank Harrington Driller: Frank Harring	Contract			The state of the s	DRILI	ING/SOIL	LOG			1 of 1
Dock			-		-		-30")	the state of the s	9/23/2005	
D. Inch A-1/4" Septical Blows Sample No. Recovery FIELD CLASSIFICATIONS AND REMARKS PID	Туре		SS	N/A				Finish:	9/23/2005	
Depth (t.) Blows Range Pipe Recovery Recovery FIELD CLASSIFICATIONS AND REMARKS PID					Rig Type	: B-53		Driller:	Frank Hari	rington
Range	I.D. Inch	4-1/4"								
0.0 0.0	Depth (ft.)	Blows	Sample	Recovery		FIELD CLASS	SIFICATIONS	AND REMARK	KS	PID
10-12' 27-22-18-15 S-3 12" Light Brown Fine-Medium SAND, Trace Silt, Trace Small Gravel. 0.0		Per 6"	No.							
10-12' 27-22-18-15 S-3 12" Light Brown Fine-Medium SAND, Trace Silt, Trace Small Gravel. 0.0	0-2'	8-9-11-11	S-1	12"	- E0		ace Silt, Trace	Small Gravel,		0.0
15-17' 8-8-9-11 S-4 18" Brown Fine-Medium SAND, Trace Silt, Trace Small Gravel (Wet). 0.0	5-7'	17-23-24-26	S-2	12"	Light Brown I	Fine-Medium S	AND, Trace S	ilt.		0.0
20-22' 10-10-9-10 S-5 15" Brown Fine-Medium SAND, Trace Silt (Wet). 0.0	10-12'	27-22-18-15	S-3	12"	Light Brown F	Fine-Medium S	AND, Trace S	ilt, Trace Small	Gravel.	0.0
Well Set @ 20.0'. 0.010 Slot Screen 5-20' No. 1 Well SAND 3-20'. Bentonite Seal 1-3'. Concrete 0-1'. Completed with Standpipe Protective Casing. Completed with Standpipe Protective Casing. PROPORTIONS O.D. sampler PROPORTIONS O.D. sampler O.D. sam	15-17'	8-8-9-11	S-4	18"	Brown Fine-M	ledium SAND,	Trace Silt, Tra	ace Small Grave	el (Wet).	0.0
SAMPLE PENETRATION RESISTANCE - 140 lb. Wt. Falling 30" on 2" O.D. sampler Density	20-22'	10-10-9-10	S-5	15"	Brown Fine-M	ledium SAND,	Trace Silt (We	et).		0.0
Density Cohesive Consistence PROPORTIONS					0.010 Slot Sc No. 1 Well SA Bentonite Sea Concrete 0-1'	reen 5-20' AND 3-20'. Il 1-3'.	rotective Casir	ng.		
Density Cohesive Consistence PROPORTIONS		SAMPLE P	ENETRATION	N RESISTANCE	- 140 lb Wt F	alling 30" on 2	"OD sample			
of Hammer Blows very loose # of Hammer Blows very soft / med-stiff / stiff soft trace 0 to 10% 0-4 loose 0-2 3-4 med-stiff / stiff little 10 to 20% 5-9 med/dense 5-8 9-15 very stiff / hard some 20 to 35% 10-29 dense 16-30 31+ and 30 to 50%	Densit			100 Table 100 Ta		uning ou on z	J.D. Sample	-	PROPORTION	VS.
0-4 loose 0-2 3-4 med-stiff / stiff little 10 to 20% stiff / very stiff / hard some 20 to 35% and 30 to 50%			very loose		- total	very soft /	eoft	trace	7	10
5-9 med/dense 5-8 9-15 very stiff / hard some 20 to 35% and 30 to 50%			200	Alexander de la companya del companya del companya de la companya				20000000		
10-29 dense 16-30 31+ and 30 to 50%		1							(a) Ford (927 March 600)	
und 30 to 30 %				-		very sum /	mard	1.1738	A CONTRACTOR OF THE PARTY OF TH	
	30-49		very dense	10-30	317			and	30 to 50%	

Security and the security of t	Tighe & Bon	N.		DF	EABOARD RILLING, IN		Test Bor Monitor		PGW-5
	Old Amherst	canonii oard Drillir	a Inc		026 SPFLD, M ING/SOIL I		Sheet No		1 of 2
Contract	Casing	Sampler	Core Barrel		/eight-lb./fall-		Start:	9/23/2005	1012
Туре	HSA	SS	N/A		300/24	30)	Finish:	9/23/2005	
O.D. Inch	8-1/2"	133	IVA	Rig Type:		Т	Driller:	Frank Harr	ington
I.D. Inch	4-1/4"			- Rig Type.	D-00		Dilliel.	FIGUR HAII	ington
Depth (ft.)	Blows	Sample	Bassiani		FIELD CLASS	IFICATIONS	AND DEMARK	/c	PID
Range	Per 6"		Recovery		FIELD CLASS	IFICATIONS I	AND KEMAKI	v.9	PID
0-2'	3-7-10-10	No. S-1	19"	Prous Vary E	ina CAND. Tra	oo Cilk Traco	Organias		0.0
0-2	3-7-10-10	5-1	19	Brown Very F	ine SAND, Tra	ce Siit, Trace	Organics.	18	0.0
5-7'	6-6-7-8	S-2	18"	Light Brown F	ine SAND, Tra	ace Silt.		.,,	0.0
10-12'	5-7-7-9	S-3	12"	Light Brown F	ine SAND, Tra	ace Silt.	-		0.0
15-17'	5-8-9-12	S-4	16"	Light Brown V	ery Fine SAND	D, Trace Silt.	***************************************	3	0.0
20-22'	5-7-12-18	S-5	12"	Light Brown F	ine-Medium SA	AND, Trace Si	lt, Trace Smal	l Gravel.	0.0
25-27'	5-8-15-13	S-6	12"	Light Brown V	ery Fine SAND	D, Trace Silt.			0.0
30-32'	12-18-18-14	S-7	14"	Light Brown V	ery Fine SAND	D, Trace Silt.	0	.1	0.0
	CAMPIE	ENETRATIC	I DECIGE :	. 446 " =	III AAU	# O D			
D		ENETRATION	RESISTANCE		alling 30" on 2	O.D. sample	r	DDODODTIO	NC
Densi				ve Consistence		 	-	PROPORTIO	N2
# of Hamm		very loose	# of Hammer		very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9		med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-2		dense	16-30	31+			and	30 to 50%	
30-49	50+	very dense		<u> </u>					

Project:	ocation Amherst, MA roject: Old Amherst Landfill ontractor: Seaboard Drilling, Inc.			P.O. BOX	EABOARD RILLING, IN 8026 SPFLD, N	IC. NA 01101	Test Bor Monitor	Well ID:	PGW-5
Contract					ING/SOIL		Sheet No	THE RESIDENCE OF THE PERSON NAMED IN COLUMN 1	2 of 2
	Casing	Sampler	Core Barrel	Hammer (V	Veight-lb./fall-	30")	Start:	9/23/2005	
Туре	HSA	SS	N/A	140/30	300/24		Finish:	9/23/2005	
O.D. Inch	8-1/2"			Rig Type:	B-53	ĺ	Driller:	Frank Hari	rington
I.D. Inch	4-1/4"								
Depth (ft.)	Blows	Sample	Recovery		FIELD CLASS	SIFICATIONS	AND REMAR	KS	PID
Range	Per 6"	No.							
35-37'	10-12-15-14	S-8	14"	Light Brown,	Very Fine SAN	D, Trace Grav	el.		0.0
40-42'	10-19-22-24	S-9	11"	Light Brown F	ine-Medium S	AND, Trace S	ilt, Trace Smal	l Gravel.	0.0
45-47'	15-18-19-23	S-10	10"	Brown Mediu	m-Coarse SAN	D, Some Sam	II Gravel (Wet)).	0.0
190								1	
50-52'	18-21-25-17	S-11	8"	Brown, Mediu	m-Coarse SAN	ND, Some Sm	all Gravel (Wet).	0.0
				Well Set @ 5	0.0'.				
			5						
				0.010 Slot Sc No. 1 Well SA Bentonite Sea Concrete 0-1' Completed wi	AND 3-50'. Il 1-3'.	rotective Casi	ng.		
									5
		ENETRATIO	N RESISTANCE	- 140 lb. Wt. F	alling 30" on 2	" O.D. sample	r		
Densi	-		Cohesiv	e Consistence				PROPORTIO	NS
# of Hamme		very loose	# of Hammer	Blows	very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9		med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-2		dense	16-30	31+			and	30 to 50%	
30-49	50+	very dense			1				

Client:	Tighe & Bon Amherst, MA				EABOARD RILLING, IN	ıc	Test Bori		PGW-6
	Old Amherst				026 SPFLD, N		INDITION A	ven ib.	1 000-0
		oard Drillir	a Inc	August and plant they also also and	ING/SOIL		Sheet No.		1 of 3
Jonitali	Casing	Sampler	Core Barrel		Veight-lb./fall-		Start:	9/26/2005	1010
Туре	HSA	SS	N/A	-	300/24	30 7	Finish:	9/26/2005	
O.D. Inch	8-1/2"	33	INIA	Rig Type:	The second secon	Γ	Driller:	Frank Harr	ington
I.D. Inch	4-1/4"	 	-	Tivid Lybe.	D-33		Dimer.	I Talik Hall	ington
Depth (ft.)	Blows	Sample	Recovery		FIELD CLASS	IFICATIONS A	AND REMARK	S	PID
Range	Per 6"	No.							
0-2'	4-8-6-7	S-1	8"	Brown Very F	ine SAND, Tra	ce Silt, Trace (Organics.		0.0
5-7'	6-5-7-9	S-2	10"	Light Brown F	ine to Medium	SAND, Trace	Silt and Trace	Small Gravel.	0.0
10-12'	8-8-7-9	S-3	6"	Light Brown F	ine SAND, Tra	ace Silt and Tra	ce Small Grav	el.	0.0
15-17'	5-8-10-11	S-4	9"	Light Brown F Gravel.	ine to Medium	SAND, Trace	Silt and Some	Small	0.0
20-22'	5-6-6-10	S-5	10"	Light Brown F	ine SAND, Tra	ce Silt.			0.0
25-27'	4-5-5-9	S-6	15"	Light Brown F	ine-Medium S	AND, Trace Sil	t, Trace Small	Gravel.	0.0
30-32'	6-7-9-11	S-7	12"	Light Brown F	ine-Medium S	AND, Trace Sil	t, Trace Small	Gravel.	0.0
	SAMPLE F	ENETRATION	N RESISTANCE	- 140 lb Wt F	alling 30" on 2	" O.D. sampler	T		
Densi				ve Consistence		J.D. Gampler	 	PROPORTIO	NS
# of Hamme		very loose	# of Hammer	***************************************	very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	E 20 marco	507435	little	1	
5-9		med/dense	5-8		med-stiff /	stiff	Para Caraca	10 to 20%	
5-9 10-2		The state of the s		9-15	very stiff /	hard	some	20 to 35%	
		dense	16-30	31+	ł	l	and	30 to 50%	
30-49	50+	very dense			1				

Client: Tighe & Bond Location Amherst, MA				1	EABOARD			Test Boring/ Monitor Well ID:		
	Old Amherst				3026 SPFLD,		I I I I I I I I I I I I I I I I I I I	WOII ID.	PGW-6	
		oard Drilli	ng, Inc.	DRILLING/SOIL LOG			Sheet No.		2 of 3	
	Casing	Sampler	Core Barrel	-	Weight-lb./fal		Start:	9/26/2005		
Туре	HSA	SS	N/A	-	300/24	•		Finish: 9/26/2005		
O.D. Inch	8-1/2"			Rig Type		T	Driller:	Frank Harr	ington	
I.D. Inch	4-1/4"			1 5 71						
Depth (ft.)	Blows	Sample	Recovery		FIELD CLAS	SIFICATIONS	AND REMARI	(S	PID	
Range	Per 6"	No.							, ,,,	
35-37'	10-7-9-12	S-8	12"	Light Brown	Light Brown Fine SAND, Trace Silt, Trace Small Gravel.					
40-42'	9-11-16-15	S-9	12"	Light Brown	Light Brown Very Fine SAND, Trace Silt and Trace Small Gravel.					
45-47'	12-15-17-25	S-10	8"	Light Brown Fine SAND, Trace Silt and Trace Small Gravel.					0.0	
50-52'	19-22-30-33	S-11	4"	Light Brown \ Gravel.	/ery Fine SAN	D, Trace Silt a	nd Trace Small		0.0	
55-57'	17-20-23-39	S-12	23"	Brown, Very	Fine SAND, Tr	race Silt.			0.0	
60-62'	17-19-21-19	S-13	15"	Light Brown \	0.0					
65-67'	18-20-17-18	S-14	12"	Light Brown Very Fine SAND, Trace Silt.						
		ENETRATION	RESISTANCE		The state of the s	" O.D. sample	r			
Densit				e Consistence				PROPORTION	NS .	
# of Hamme		very loose	# of Hammer		very soft /	soft	trace	0 to 10%	d	
0-4		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%		
5-9		med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%		
10-29	i	dense	16-30	31+	1		and	30 to 50%		
30-49	50+	very dense								

Client: Tighe & Bond Location Amherst, MA Project: Old Amherst Landfill Contractor: Seaboard Drilling, Inc.			SEABOARD DRILLING, INC. P.O. BOX 3026 SPFLD, MA 01101 DRILLING/SOIL LOG			Test Bori Monitor V	PGW-6		
						Sheet No		3 of 3	
	Casing	Sampler	Core Barrel	Hammer (V	/eight-lb./fall-	30")	Start:	9/23/2005	
Туре	HSA	ss	N/A	140/30 300/24		Finish:	9/23/2005		
O.D. Inch	8-1/2"			Rig Type:	The second liverage and the se	l .	Driller:	Frank Harr	ington
I.D. Inch	4-1/4"			1 0 7			THE SUBSCIPE OF SECTION		Early State of State
Depth (ft.)	Blows	Sample	Recovery		FIELD CLASS	IFICATIONS	AND REMARK	(S	PID
Range	Per 6"	No.	•					33.50	
75-77'	17-19-21-18	and the second second second second	15"	Light Brown, \	ery Fine SANI	D, Trace Silt.			0.0
80-82'	15-17-18-23	S-17	19"	Brown Fine S	AND, Trace Sil	t (Wet).	4		0.0
85-87'	16-18-24-17	S-18	15"	Brown Very F	ine SAND and	Silt.			0.0
1 4								L	
90-92'	19-20-22-23	S-19	12"	Brown Very F	ine SAND and	Silt.			0.0
				Well Set @ 8	8.0'. (Total Dep	th).			
				0.010 Slot Sc No. 1 Well SA Bentonite Sea Concrete 0-1'	ND 6-88'. I 4-6'.	rotective Casi	ng.		
11				Odnipicted in	пошторь	otoure ous	19.		
	SAMPLE P	ENETRATION	RESISTANCE	- 140 lb. Wt. F	alling 30" on 2'	O.D. sample	r		
Dens				ve Consistence				NS	
# of Hamm	Name and Address of the Owner, where the Party of the Owner, where the Party of the Owner, where the Owner, which is the Owner, where the Owner, which is the Own	very loose	# of Hammer		very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9	,	med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-2	9	dense	16-30	31+			and	30 to 50%	
30-49	50+	very dense					1	1	

Client: Tighe & Bond Location Amherst, MA			SEABOARD DRILLING, INC.			Test Bor		PGW-7	
Project: Old Amherst Landfill			P.O. BOX 3026 SPFLD, MA 01101			Monitor Well ID: P		PGVV-7	
Contractor: Seaboard Drilling, Inc.			DRILLING/SOIL LOG			Shoot No	1 of 2		
Contract	Casing	Sampler	Core Barrel				Sheet No.		1012
Tuna	HSA	SS		-	Hammer (Weight-lb./fall-30")		Start:	9/26/2005	
Туре	8-1/2"	55	N/A	140/30 300/24			Finish: 9/26/2005		
The state of the s				Rig Type	: B-93	1	Driller:	Frank Harr	ington
J.D. Inch	4-1/4"			-			1		
Depth (ft.)	Blows	Sample	Recovery		FIELD CLASS	SIFICATIONS	AND REMARI	KS	PID
Range	Per 6"	No.							
0-2'	8-9-10-9	S-1	8"	Brown Very F	Fine SAND, Tra	ace Silt, Trace	Organics.		0.0
5-7'	7-18-19-22	S-2	6"	Light Brown	Gravel.	0.0			
10 10	2244	0.0	1011				***************************************		
10-12'	3-3-4-4	S-3	12"	Light Brown	Fine SAND, Tr	ace Silt.		1	0.0
*									
15-17'	4-4-3-5	S-4	2"	Light Brown I	ine SAND, Tr	ace Silt.			0.0
		21							
20-22'	3-3-4-4	S-5	12"	Light Brown	/ery Fine SAN	D, Trace Silt.			0.0
25-27'	3-4-4-4	S-6	14"	Light Brown	/ery Fine SAN	D, Trace Silt.		-	0.0
			-						
30-32'	4-5-5-6	S-7	18"	Light Brown	ery Fine SAN	D, Trace Silt.			0.0
					A1 10				
		ENETRATION	RESISTANCE	- 140 lb. Wt. I	alling 30" on 2	" O.D. sample	r		
Densi	The state of the s			e Consistence				PROPORTION	NS
# of Hamme		very loose	# of Hammer	Blows	very soft /	soft	trace	0 to 10%	
0-4		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9		med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-29	9	dense	16-30	31+			and	30 to 50%	
30-49	50+	very dense							

Client: Tighe & Bond Location Amherst, MA			SEABOARD Test Boring/ DRILLING, INC. Monitor Well ID: P					PGW-7	
Project: Old Amherst Landfill			P.O. BOX 3026 SPFLD, MA 01101						
Contractor: Seaboard Drilling, Inc.			DRILLING/SOIL LOG			Sheet No	2 of 2		
	Casing	Sampler	Core Barrel		Hammer (Weight-lb./fall-30")		Start:	9/26/2005	
Туре	HSA	ss	N/A	-	300/24		Finish:	9/26/2005	
O.D. Inch	8-1/2"			Rig Type:			Driller:	Frank Harr	ington
I.D. Inch	4-1/4"			1 0 7.					
Depth (ft.) Range	Blows Per 6"	Sample No.	Recovery		FIELD CLASS	IFICATIONS A	AND REMARI	KS	PID
35-37'	4-6-5-5	S-8	12"	Light Brown \	ery Fine SAND), Trace Silt.			0.0
40-42'	3-6-5-4	S-9	14"	Light Brown \	ery Fine SAND	D,Trace Silt.	B		0.0
45-47'	3-4-6-6	S-10	14"	Light Brown \	ery Fine SAND),Trace Silt.			0.0
50-52'	4-5-3-6	S-11	12"		ery Fine SAND	,Trace Silt.			0.0
				Well Set @ 5	0.0.'.	1			
				0.010 Slot Sc No. 1 Well SA Bentonite Sea Concrete 0-1' Completed wi	AND 3-50'. al 1-3'.	rotective Casin	g.		
	SAMDLE	DENETRATIO	N DECICTANO	140 lb 10/4 F	falling 2011 on 01	IOD comple			
			- 140 lb. Wt. Falling 30" on 2" O.D. sample				JS.		
Densi # of Hamme		wony loose	_	ve Consistence		0.04		PROPORTION	VO
# 01 Hamme		very loose	# of Hammer		very soft /	soft	trace	0 to 10%	
		loose	0-2	3-4	med-stiff /	stiff	little	10 to 20%	
5-9		med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-2		dense	16-30	31+	1		and	30 to 50%	
30-49	50+	very dense		-	<u> </u>	L		1	

Client:	Tighe & Bon				EABOARD		Test Bori		B-05-0
	Amherst, MA				DRILLING, INC. Monitor Well ID:				
Project: Old Amherst Landfill Contractor: Seaboard Drilling, Inc.				P.O. BOX 3026 SPFLD, MA 01101					
Contract				DRILLING/SOIL LOG Sheet No.					1 of 1
	Casing	Sampler	Core Barrel		Veight-lb./fall-	30")	Start:	9/22/2005	
Туре	HSA	SS	N/A		300/24		Finish:	9/22/2005	
O.D. Inch	8-1/2"			Rig Type	B-53	1	Driller:	Frank Harri	ngton
I.D. Inch	4-1/4"					1			
Depth (ft.) Range	Blows Per 6"	Sample No.	Recovery		FIELD CLASS	SIFICATIONS A	AND REMARK	(S	PID
0-2'	5-6-6-8	S-1	10"	Brown Very F	ine SAND, Tra	ce Silt, Trace (Organics.		0.0
5-7'	9-12-12-10	S-2	11"	Brown, Very		0.0			
10-12'	6-6-7-8	S-3	8"	Black, Fine-Medium SAND, Landfill Debris.					0.8
15-17'	10-11-8-9	S-4	8"	Black to Brown Fine-Medium SAND and Landfill Debris.					13.2
20-22'	No Data	S-5	8"	Black, Fine-N		6.8			
25-27'	15-18-16-13	S-6	0"	No Recovery.	· · · · · · · · · · · · · · · · · · ·				
30-32'	8-12-9-11	S-7	12"	Light Brown to		0.3			
35-37'	9-8-11-10	S-8	12"	Light Brown,	Very Fine SAN	D, Trace Silt.			0.0
	SAMPLE P	ENETRATION	I RESISTANCE	- 140 lb \\/+ 5	alling 30" on 2	"OD campler			
				- 140 lb. Wt. Falling 30" on 2" O.D. sampler ve Consistence PROPORTI					IS
# of Hamme		very loose	# of Hammer		very soft /	soft	trace		
0-4	The second second second	loose	0-2	3-4			1	0 to 10%	
5-9					med-stiff /	stiff	little	10 to 20%	
		med/dense	5-8	9-15	very stiff /	hard	some	20 to 35%	
10-2		dense	16-30	31+	1		and	30 to 50%	
30-49	50+	very dense						L	

GeoTesting express

a subsidiary of Geocomp Corporation

1145 Massachusetts Avenue Boxborough, MA 01719 978 635 0424 Tel 978 635 0266 Fax

Transmittal

го:				
Mr. Jason Pe	erry		DATE: 1/19/09	GTX NO: 8790
Tighe & Bon	nd		RE: Old Amherst Lan	dfill CSA Project
53 Southam	pton Road			
Westfield, M	IA 01085			,
COPIES	DATE		DESCRIPTION	*0 0
1	1/19/09	January 2009 Laboratory	Test Reports	
REMARKS:				
				1
				f:
		SIGNED): Let	
CC:		*	Joe Tomei – Laborato	
				, 11

APPROVED BY: _

Mark Dobday, P.G. - Laboratory Manager



a subsidiary of Geocomp Corporation

Boston Atlanta New York

www.geocomp.com/geotesting

January 19, 2009

Mr. Jason Perry Tighe & Bond 53 Southampton Road Westfield, MA. 01085

Re:

Old Amherst Landfill Project (GTX-8790)

Dear Mr. Perry:

Enclosed are the test results you requested for the above referenced project. GeoTesting Express, Inc. (GTX) received 17 soil samples from you on January 9, 2009. These samples were labeled as follows:

Sample	Depth
Well #2-08	80-82 ft
Well #3-08	80-82 ft
Well #4-08	48-50 ft
Well #6-08	25-27 ft
Well #6-08	45-47 ft
Well #6-08	51-53 ft
Well #7-08	10-12 ft
Well #8-08	10-12 ft
Well #9-08	95-97 ft
Well #9-08	125-127 ft
Well #10-08	10-12 ft
Well #10-08	45-47 ft
Well #10-08	85-87 ft
Well #1-08	15-17 ft
Well #12-08	10-12 ft
Well #12-08	45-47 ft
Well #12-08	55-57 ft

GTX performed the following tests on these samples:

4 Grain Size Analyses (ASTM D 422) – sieve portion only

13 Grain Size Analyses (ASTM D 422) with hydrometer

The hydrometer portion of the analyses was only performed if the sample contained greater than 10% passing the No. 200 sieve.

Copies of your test request forms are attached.

The results presented in this report apply only to the items tested. This report shall not be reproduced except in full, without written approval from GeoTesting Express. The remainder of these samples will be retained for a period of sixty (60) days and will then be discarded unless otherwise notified by you. Please call me if you have

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Boston Atlanta New York

www.geocomp.com/geotesting

any questions or require additional information. Thank you for allowing GeoTesting Express the opportunity of providing you with testing services. We look forward to working with you again in the future.

Respectfully yours,

Joe Tomei

Laboratory Manager

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				B